

From THE DEPARTMENT OF PUBLIC HEALTH SCIENCES  
Karolinska Institutet, Stockholm, Sweden

*Social capital and Work Participation  
among People with Mobility Disability and  
Overweight*

Mattias Norrbäck



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Institutet**

**Department of Public Health Sciences**

*Social capital and Work Participation among  
People with Mobility Disability and Overweight*

THESIS FOR DOCTORAL DEGREE (Ph.D.)

by

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“Anyone who has never made a mistake has never tried anything new.”

*Albert Einstein, physicist (1879-1955)*

## ABSTRACT

People with disabilities or who are overweight/obese may have fewer opportunities and experience more barriers to a social participation and working life than people without disabilities or overweight/obesity. Even less is known about the social and working life participation of people who are burdened with *both* mobility disability (MD) *and* obesity. This relatively large group of people may not be given equal opportunities to social inclusion and work as people without MD and/or overweight/obesity. This thesis focuses on Swedish people between 19 and 64 years of age who have participated in population-based surveys of health and living conditions. Specific questions on weight (kg), height (m), and MD were used to identify the study populations. People with a BMI  $\geq 18.5$  kg/m<sup>2</sup> and/or MD (six study groups in total) were compared with a reference group of people without MD and of normal weight, and also with people who had only one of these conditions. Outcomes investigated between the study groups were social capital (reflecting broader aspects of social participation), work environment, disability pension, and unemployment.

The results showed that when compared with the reference group, people with MD and obesity did not differ in structural social capital over time, but had lower cognitive social capital over time. They were also more exposed to demanding work environments, over which they had little or no control. It was also found that people with MD and obesity were at much higher risk of being prematurely excluded from the working life through disability pension, and were more likely to be unemployed, with more unemployment days on average per year. The results also showed that people with MD and obesity did not differ on most study outcomes compared with other people with MD only. It thus seemed that MD has a greater impact on social and work participation than overweight/obesity. In conclusion, people with MD (with or without overweight/obesity) had difficulties in participating in several important domains of social life, which remains a great challenge for public health practitioners, policy makers, and politicians in Sweden.

## LIST OF SCIENTIFIC PAPERS

- I. Norrbäck M, De munter J, Tynelius P, Ahlström G, Rasmussen F.  
The association of mobility disability, weight status and job strain: A cross-sectional study.  
Disabil Health J. 2015 Apr;8(2):200-7
- II. Norrbäck M, De munter J, Tynelius P, Ahlström G, Rasmussen F.  
The association of mobility disability, weight status and job strain: A cross-sectional study.  
Scand J Public Health. 2016 May;44(3):311-9.
- III. Norrbäck M, De munter J, Tynelius P, Ahlström G, Rasmussen F.  
The association of mobility disability and weight status with risk of disability pension: a prospective cohort study. (Submitted, 2016.)
- IV. Norrbäck M, Tynelius P, Ahlström G, Rasmussen F.  
The association of mobility disability and obesity with risk of unemployment in two cohorts from Sweden. (Submitted, 2016.)

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## **LIST OF ABBREVIATIONS**

BMI	BODY MASS INDEX
DALY	DISABILITY-ADJUSTED LIFE YEAR
ICF	INTERNATIONAL CLASSIFICATION OF FUNCTIONING DISABILITY AND HEALTH
LISA	LONGITUDINAL INTEGRATION DATABASE FOR HEALTH INSURANCE AND LABOR MARKET STUDIES
MD	MOBILITY DISABILITY
PES	THE PUBLIC EMPLOYMENT SERVICES
SPHS	STOCKHOLM PUBLIC HEALTH SURVEYS
SPHC	STOCKHOLM PUBLIC HEALTH COHORT
SILC	THE SWEDISH LIVING SURVEYS
YLD	YEARS LIVED WITH DISABILITY
WHO	WORLD HEALTH ORGANIZATION

# 1. INTRODUCTION

Today, in the 21<sup>st</sup> century, evidence shows a reduction in age-sex specific mortality in the global population (1), and people appear to live longer on average, which is associated with a 5-year increase in disability-adjusted life years (DALYs) (2). However, relevant data on disability are scarce and have also proved difficult to estimate, leaving a lot of uncertainty over whether the extra years gained are necessarily lived in good health. For example, evidence shows that years lived with disability (YLD) are declining at a much slower rate than mortality (3). From 1990-2013, among the top leading causes of YLDs, was low-back pain, whereas musculoskeletal disease was one of the main drivers of increases in YLD rates per person (3).

Given that disability trends appear to increase world-wide, they may have implications for the societal participation of people in affected countries. Looking at the estimates in more detail, it becomes obvious that the impact of disability on participation will differ a lot between countries, even within the developed regions of the world (4).

Sweden is recognized as one of the most equal countries in the world, partly due to its relatively stable economic growth (5), and high spending on social welfare aimed at reducing inequalities among its citizens (6, 7). Despite this, differences in health and living conditions (8), and work participation (9, 10) still remain between people with disabilities and those without. However, less is known about the societal participation of specific groups with disability, especially among those with multiple disabilities. The focus of this thesis was, therefore, on examining social and work participation among people burdened with both mobility disability (MD) and obesity. These individuals are compared with people who have one or neither of the disabilities (MD or overweight/obesity). Two areas of societal participation are examined between the groups: social and work participation.

# 1 BACKGROUND

## 1.1 WHAT IS DISABILITY?

Disability is a natural part of human existence with varying impacts on health, participation, and quality of life along a person's life time. To better understand disability, several conceptual models have been proposed, such as the biomedical model and the social (or environmental) model (11, 12). These two models contrast with one another, the former focusing solely on biological and physiological factors within individuals to explain disability, the latter mainly focusing on social and physical factors in the environment that surrounds and interacts with individuals' disability. The International Classification of Functioning, Disability and Health (ICF) framework by the World Health Organization (WHO), is the latest proposed model to integrate the theories in both models to understand the emergence of disability. According to the ICF model, disability emerges when person-specific characteristics, such as bodily functioning, interact with the social and physical environment in which a person lives to hinder daily activities and participation with others (13).

The ICF framework considers disability in a comprehensive and multi-dimensional manner, encompassing the biological, psychological, social and contextual dimensions of health, health behaviors and well-being. However, empirically based models still give incomplete representations of aspects/features of the world, and are therefore limited in the way they help us explain, define, or quantify these particular aspects or features. Indeed, the ICF framework has been criticized for being overly simplistic and unclear about its components and their interaction to bring about disability (14, 15). The model, however, has been extensively explored within disability research during the 15 years since its initiation (16, 17).

In the studies included in this thesis, questions on MD, weight, and height were used to classify MD and weight status. That said, while I am not using the framework explicitly, I agree with the proposed theory of the ICF on how MD and obesity can emerge, and discuss their potential implications for our results related to social capital and work participation presented in this thesis.

## **1.2. MOBILITY DISABILITY**

### **1.2.1 Definition**

As we grow older, we will certainly experience problems with mobility and overall functioning. Apart from biological ageing, when considered within the context of the ICF framework, there are many potential explanations for why we may experience MD. Some are more obvious like accidents, and chronic diseases causing the restriction of bodily functions. This often occurs in people with injuries or diseases in the musculoskeletal system, for example, rheumatoid arthritis, osteoarthritis, and disorders related to the spinal system. However, MD is also common in people with musculoskeletal pain and other related chronic health problems (18, 19).

In addition, factors that generate or contribute to disability may be due to inadequate community infrastructure, socio-economic status, or attitudes and behaviors in society. Due to the varied nature of MD, no currently agreed definition exists in the research literature. In the studies conducted for this thesis I have identified people with MD based on self-reported information taken from questions relating to mobility restrictions in daily activities, such as walking or running a short distance, climbing stairs or onto a bus, or being able to rise up from a chair.

### **1.2.2 Prevalence**

MD occurs in men and women of all ages and in all sociodemographic groups in society, and is one of the most commonly reported disabilities in the world (20). As previously mentioned, since no currently agreed definition of MD exist, the prevalence of MD (i.e. the total number of individuals with MD divided by the total population) within and between countries may vary considerably depending on to the definition chosen, and the type and quality of data available. Based on measures using self-reported data from population-based surveys, MD accounts for approximately 10-12 percent of all disabilities in Sweden (21, 22), which is still lower than the prevalence reported in for instance the US (23).

## **1.3 OBESITY**

Although the studies in this thesis include groups of people with either overweight or obesity, I will restrict their content mainly to focus on obesity.

### **1.3.1 Definition**

The WHO has defined obesity as “abnormal or excessive fat accumulation that may impair health” (24). Because of its great impact at both individual and population level (25-27), and the increased risk of mortality (28), and social consequences, such as stigmatization (29, 30), much attention has been paid to the prevention and treatment of obesity. Obesity has been defined as a disease in the International Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) (31). However, due to a broad spectrum of determinants as well as medical and social consequences, obesity is a multi-faceted disability (32-34). In this thesis we classify people as obese according their Body Mass Index (BMI), calculated from self-reported weight (kg) divided by height in meters squared ( $m^2$ ), according to the classification of the WHO (Table 1) (35). This is one of the most prevailing methods used in epidemiological studies because it offers a pragmatic solution to weight classification of large samples of individuals.

In the studies in this thesis, people with a BMI equal to 30 kg/m<sup>2</sup> and above were classified as being obese.

**Table 1. The World Health Organization’s weight classification system using the Body Mass Index (BMI), calculated as weight (kg) divided by height squared (m<sup>2</sup>)**

<u>BMI range</u>	<u>Weight classification</u>
18.5-24.9	Normal weight
25-29.9	Overweight
≥ 30	Obesity
30-34.9	Obesity class I
35-39.9	Obesity class II
≥ 40	Obesity class III

### 1.3.2 Prevalence

There have been widespread calls for the regular monitoring of the prevalence of overweight and obesity. Monitoring of country-specific obesity prevalence is often conducted by population-based surveys, which include questions on self-reported weight and height. Estimating obesity prevalence from surveys is a relatively cheap method although obesity levels are often underestimated and measured data would be preferable due to their higher quality. Further, the prevalence may be biased by relatively higher non-response, for example, among young people, people from minority groups, and among those with low education. Despite the lack of complete and unbiased information on obesity prevalence, large collaborations of researchers, public health workers, and officials have tried to estimate obesity levels and trends in systematic analyses. Results from recent studies show high, but large variations in, overweight obesity prevalence between countries, and points towards increases in overweight and obesity prevalence in many developing countries (36-38). In Sweden, the prevalence of obesity in the total adult population is around 10-12 percent (39) (21), which appears to have remained at similar levels since 2010 (39).

## 1.4. THE RELATIONSHIP BETWEEN MOBILITY DISABILITY AND OBESITY

The societal challenges faced by individuals may become more difficult to overcome if both MD and obesity are present. The potential social consequences of the co-occurrence of both these disabling conditions will from here on be referred to in terms of a “*double burden*”. How the double burden of MD and obesity may influence the daily-life activities and participation of individuals has so far received little attention within public-health and disability research.

Figure 1 shows a conceptual model of how MD and obesity may be related to each other and the components of the ICF framework. Results from a Swedish study showed that people with MD are much more often overweight or obese than people without MD (40). Notably, 30 percent more women with MD reported being obese compared with women from the general population. Further, a recent longitudinal study has found a bidirectional association

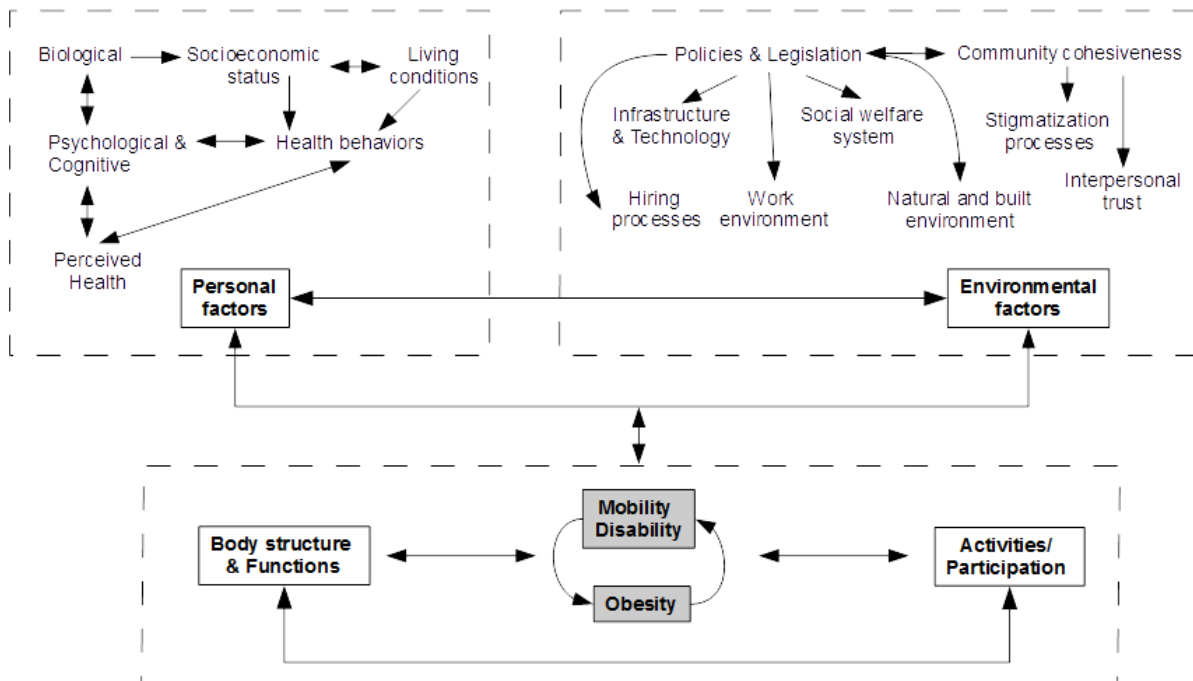
between MD and obesity in a Swedish population (41). The study showed that during 8 years of follow-up, people with MD were more likely to develop obesity than people without MD. Similarly, individuals with obesity were more likely to develop MD compared with their normal weight peers (41). Evidence from the international literature shows that people with MD are more often obese than people without MD (42). Obesity has also been associated with MD in both children and older adult populations (43-45). However, weight gain per se may also be associated with MD in later life (46). Indeed, one study found that being obese in adulthood was associated with a more than two-fold increase in the risk of MD among elderly men, compared with those of normal weight in adulthood (47).

Further, obesity has been shown to increase the risk of knee-related health disorders (48) through increased joint pressure, and may exacerbate the severity of back pain (48, 49), which may contribute to mobility limitations. Difficulties in walking may increase the risk of weight gain due to lower levels of physical activity, decreased energy expenditure, and perhaps increased intake of unhealthy food as a consolation for sadness, boredom, or loneliness(50).

MD and obesity have been linked to a number of diseases and health problems, including cardiovascular disease, diabetes, and chronic pain (20, 25, 27, 51, 52). The combined condition may create barriers to social activities and participation (42), and may also create a burden on health that is beyond the sum of each of the conditions alone.

The shared norms, beliefs, and values of society may also create a social barrier associated with prejudice, stigmatization, or discrimination, which may have profound effects on health, participation, and quality of life for people with MD and obesity (29, 53, 54). Stigmatization may contribute to low self-esteem and psychological distress, which could increase proneness to overeating and low physical activity (55).

## Mobility Disability and Obesity in the ICF framework

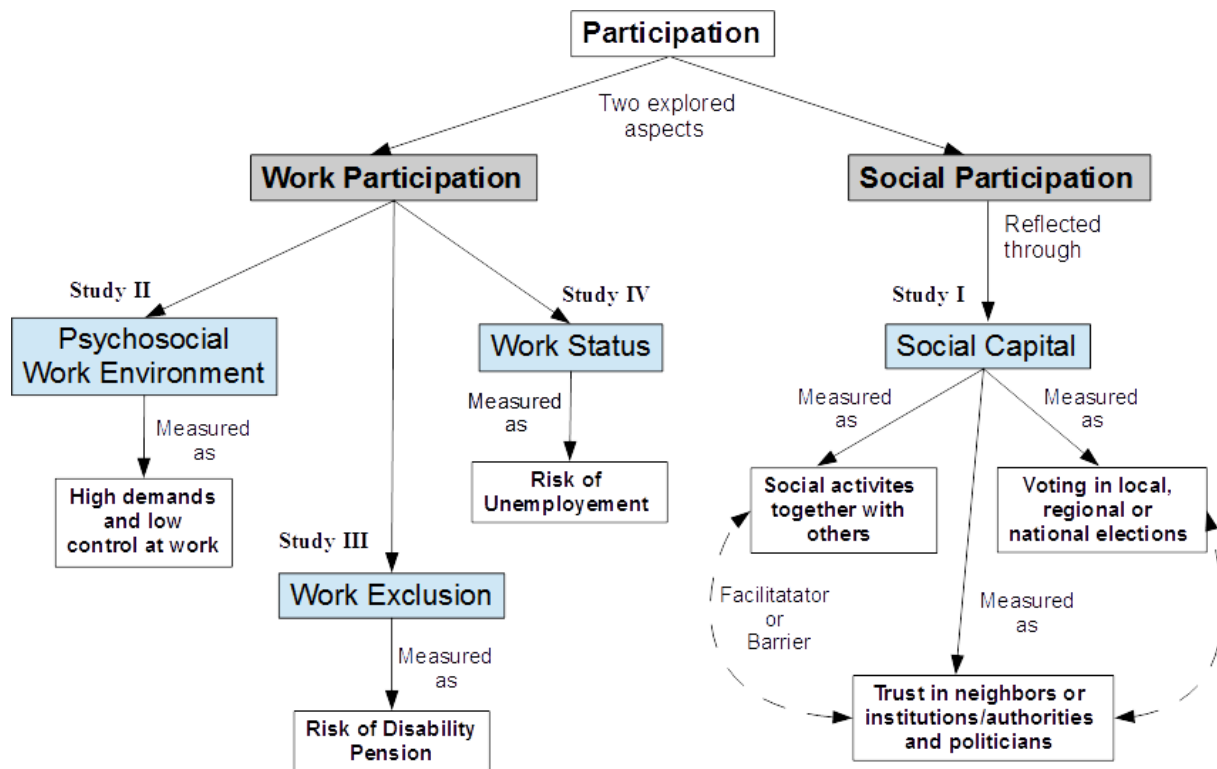


**Figure 1.** Adapted with permission from (13). A conceptual model of how mobility disability and obesity may interact together with the components of the ICF framework. The burden of MD and obesity resulting from, for example, impairments to body structures and functions or health conditions will interact with personal factors, such as sex, age, socio-economic status, and health behaviors; and environmental factors, such as infrastructure, the built environment, stigmatization, or a country's welfare system, which may limit daily activities and hinder social and work participation.

### 1.5 PARTICIPATION

Participation is a concept frequently used and discussed within the fields of public health and disability research (14, 56, 57). According to the ICF, participation is loosely defined as “involvement in a life situation” (13). To date, there is still no clear interpretation of what participation really means. This conundrum is reflected in the ICF framework, where the components, activities and participation, are not distinguished (Figure 1).

The results from two aspects of participation is presented in this thesis i.e. social and work participation (Figure 2). Social participation may be considered as just another form of participation, but could also be a distinctive concept on its own (58). In this thesis, I consider social participation to be an active involvement together with others which could occur both in and outside the home, and is part of a domestic role (59, 60). Social participation is explored through social capital (Figure 2) by mainly study peoples' involvement in social activities, voting behavior, and their interpersonal trust (see next chapter). Work participation is defined as the capability and/or opportunity to be employed, or being an active part of the work force. Work participation is studied through peoples' psychosocial work environment, and their risk of disability pension and unemployment (Figure 2).

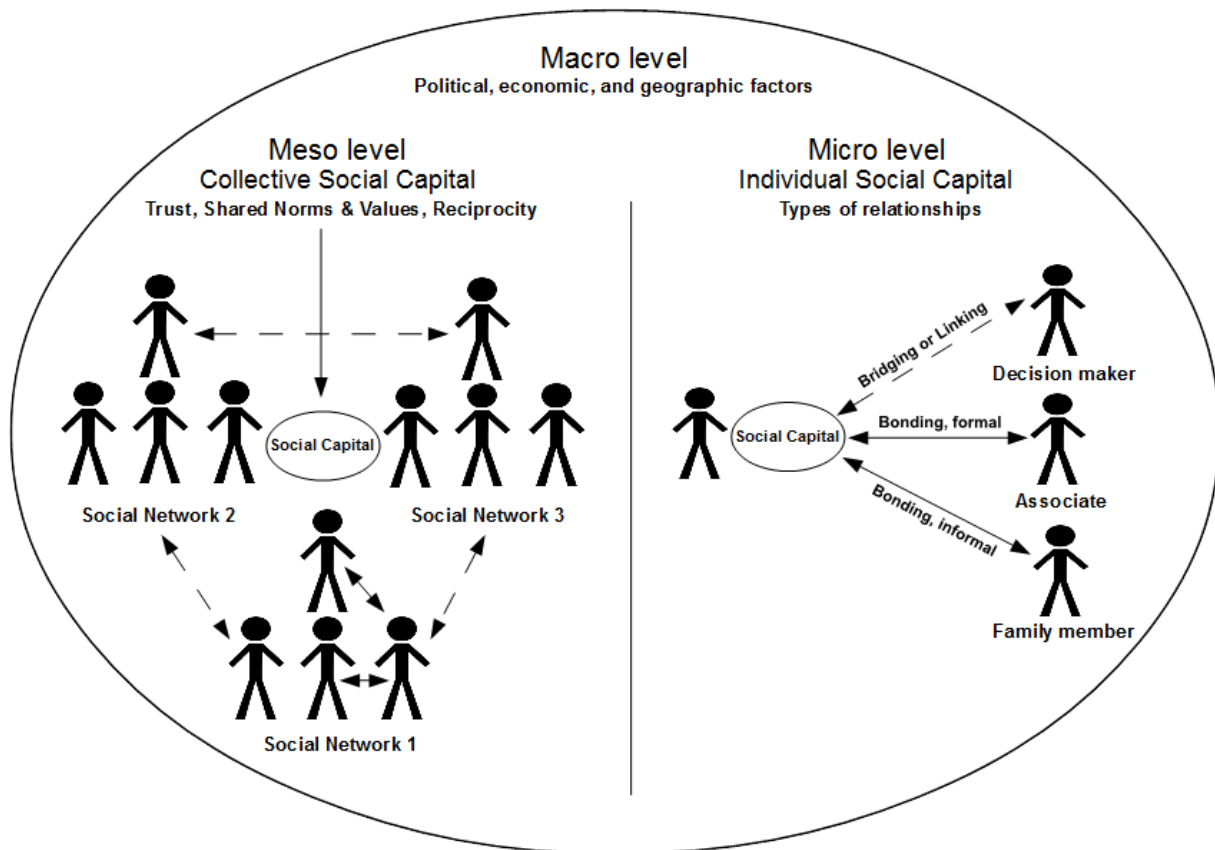


**Figure 2. Conceptualization of aspects of participation explored in this thesis.** Disability and Participation are mutually dependent. The participation of people with mobility disability and/or overweight/obesity is divided into two important aspects, Work and Social Participation. Work Participation is explored by investigating work status, unemployment risk, premature work exclusion (through disability pension), and work environment (the type associated with health problems and work exclusion). Social Participation is explored by studying social capital. Social capital is explored through activity involvement with others and through voting in elections (structural social capital). Interpersonal trust in neighbors or institutions/authorities and politicians (cognitive social capital) is also explored and is thought to act as a barrier to or facilitator of social participation.

### 1.5.1 Social capital

The concept of social capital originates from the social sciences, and through interdisciplinary contributions made by Bourdieu (61), Coleman (62, 63), Putnam (64, 65), and Portes (66). Over the years the concept has developed theoretically, as too has its applications within different fields of research. Social capital can be thought of in terms of potential “assets” generated through social relationships within groups and larger social networks. The two main theories (illustrated in Figure 2) suggest that these assets are generated by individuals (61, 66) or by a social organization, creating collective belonging and benefits to individuals within groups and organizations (62-65). Examples of direct assets include valuable information on, for example, healthy food choices and regimes, and relationships of importance for income and position on the labor market. More indirect assets include high levels of social support, and a sense of belonging or purpose.





**Figure 3. Conceptual levels of social capital as viewed in this thesis.** At the macro level, national politics, economics, and the geography within a country will interact and facilitate cohesion or create tension between citizens. For example, countries with high spending on social welfare or work participation may create rich deposits of social capital available to its citizens. At the meso level, bigger social organizations, for example, whole neighborhoods or bigger social networks, will foster rich amounts of social capital for their members through high interpersonal trust, shared norms, values, beliefs and reciprocity. In the right part of the figure, this is illustrated by the dashed arrows going between social networks. At the individual level, social capital is generated by different types of social relationships between individuals. Bonding social capital is generated not only through informal relationships with family members or close friends, but also through more formal relationships with people of different backgrounds. Here, social capital may take the form of social and financial support or job opportunities. This is illustrated by the whole arrows in the left and right part of the figure. Bridging social capital relates to relationships between people or groups with unequal distributions of power, resources, or status. Through increased co-operation, this form of social capital may benefit not only the individual but also people within a whole city or local community. Such a relationship can form between a researcher and a policy maker or public health worker. This is illustrated by the dashed arrows.

In order to make further sense of how and for whom social capital may be beneficial, more nuanced conceptualizations have been proposed (67), dividing social capital on four main dimensions: structural, cognitive, horizontal, and vertical (68). At the structural level, social capital focuses on contextual aspects of social organization. That is, what people do and how that affects the structure and density of their social networks. Cognitive social capital focuses on the shared norms, values, and beliefs of social organizations. It highlights perceptions of interpersonal trust and reciprocity (Figure 3). In other words, what people feel, think, and share in their social networks and relationships. Horizontal social capital refers to relationships between either homogenous or heterogeneous groups of people. Homogenous groups includes individuals at the same level within a social construct, such as colleagues, close friends, or family (informal bonding). Heterogeneous groups includes individuals of different

cultural, occupational or ethnic backgrounds (formal bonding). Last, vertical social capital refers to relationships between people or groups with unequal access to power, resources or status (Figure 3)(68, 69).

The complexity of social capital with its attempt to address several broad concepts such as social cohesion, social support, economic development or social and economic inequalities, has received justified criticism (70-72). Despite the criticism, there is a vast amount of research that spans over decades, demonstrating associations between the various forms and dimensions of social capital and aspects of health (68, 69, 73-77).

### **1.5.2 Work participation**

According to the United Nations' Convention on the Rights of Persons with Disabilities, member states are obliged to ensure the full participation and inclusion in society of people with disabilities. Being part of the labor force and enjoying equal opportunities to gain a living by work, freely chosen or accepted, is an important aspect of participation, and a vital part of their quality of life (6). Nonetheless, the negative impact of MD and obesity on work participation has repeatedly been demonstrated (4, 29, 53, 78-82). Major contributing factors to low participation in working life are, for example, comorbidities associated with MD and/or obesity, physical and environmental obstacles in the workplace, and stigmatization by employers or co-workers. Three of the studies in this thesis have explored possible implications of the double burden of MD and obesity on outcomes related to work participation: the work environment, disability benefits associated with reduced work capacity (disability pension), and the accumulated number of days of unemployment.

#### **1.5.2.1 Job strain and the work environment**

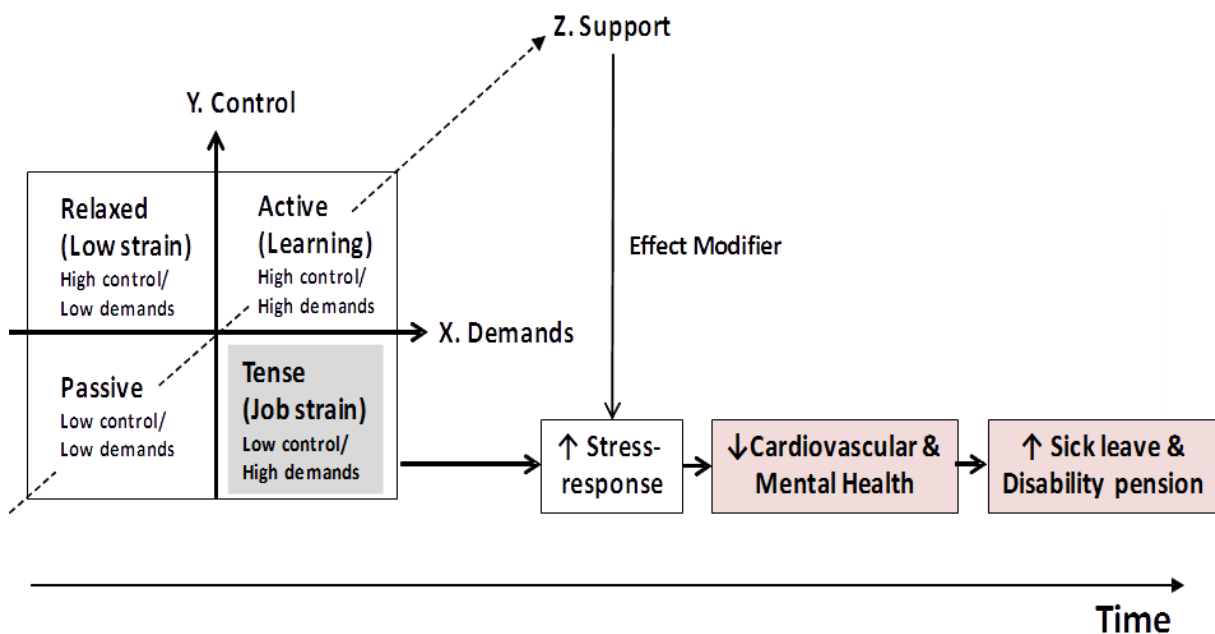
Through processes of globalization, deindustrialization and the advancement of information technology, fewer people will spend their working life being employed full-time in permanent positions (83), and may not be exposed to a "traditional" work environment. However, most adults, whether disabled or not, spend a large part of their time in workplaces. In these settings, they might be exposed to psychosocial and physical factors that may cause health problems. Examples are stress, demands for productivity, and absence of social support from colleagues and superiors. Many attempts have been made to improve understanding of workplace-related psychosocial risks and protective factors and the health of employees by means of theoretical frameworks such as the demand-control model (84-86).

The demand-control model, proposes that long-term exposure to a particularly harmful combination of psychosocial stressors, i.e. high work demands and low job control/decision capabilities (referred to as job strain), will cause an internal stress response associated with the development of chronic health problems (Figure 4) (87). Later revisions of the model include level of social support at work, which has been shown to function as a buffer by reducing the negative impact of job strain on health (88) in both men (89) and women (90).

Since its inception, the model has been criticized for being overly simplistic in the conceptualization and operationalization of how job strain occurs, and can be detrimental for health. Additional criticism revolves around how adequately to measure job strain, using self-reported versus objective assessments. Lastly, criticism has been concerned with difficulties in distinguishing between the effect of job strain on health and confounding by other related

factors, such as socio-economic status and personal characteristics like coping mechanisms (91).

Despite its shortcomings, an abundance of research has shown relationships between job strain and cardiovascular diseases (92, 93). More recent research confirms these associations; for example, a recent meta-analysis, based on observational studies, have shown how job strain is related to hypertension (OR:1.3; 95%CI:1.14-1.48). Another meta-analysis has shown an association between job strain and the risk of cardiovascular risk factors such as physical inactivity (OR: 1.34; 95% CI 1.26–1.41) and type 2 diabetes (OR:1.29; 95% CI: 1.11–1.51), after relevant adjustments. Finally, a third meta-analysis found a small but consistent risk of coronary heart disease (HR:1.17; 95% CI: 1.05–1.31), after adjustments for age, sex, and socio-economic status. In addition, research in recent years has shown a clear association between job strain and mental health outcomes, including depression, stress-related disorders and well-being (94-98).



**Figure 4 adapted from (87). The Demand-Control-Support conceptual model, illustrating the envisaged association between psychosocial factors in the work environment and health.** The model shows a quadrant resulting from the intersection between job demands (X-axis) and job control (Y-axis), two psychosocial factors in the work environment. The theory assumes that a particular combination of these factors, i.e. high job demands and low work control (lower right quadrant in grey), will generate a physiological stress response (referred to as job strain). Being continuously exposed to job strain may result in decreased cardiovascular, and mental health. This may in turn lead to reduced work capacity and well-being, associated with the risk of more and longer sick leave spells or even disability pension. Social support at work (the dashed Z-axis) is thought to modify the effect of job strain on health. More specifically, it can either ameliorate (buffer) or worsen the negative effect of job strain on health.

#### 1.5.2.2 The Swedish “welfare model”

The Swedish “welfare model” is known world-wide and reflects high spending of the national GDP on social welfare (99). The social insurance program, administered by the Social Insurance Agency, covers almost all people who live or work in Sweden (100). It enables

financial security, in the form of benefits mainly to families, the sick, and the disabled. In 2015, it constituted nearly 5% of national GDP (Figure 5) (101).

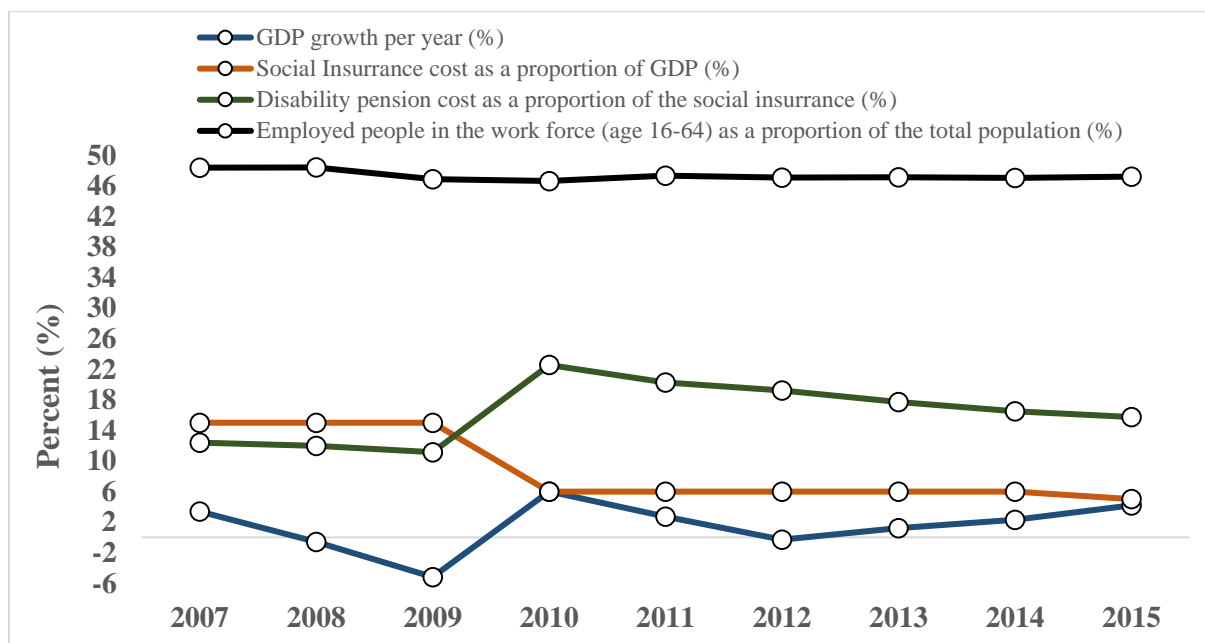
When studying risk associations of disability pension and unemployment in groups such as people with MD and/or obesity, a couple of issues should be considered. First, there is a relationship between disability pension and unemployment. Countries with high spending, on social benefits, such as the Nordic countries, tend to have lower unemployment rates in the population, but a higher proportion of disability benefits (excluded from the work force), compared with countries that spend more resources on active labor market programs (4, 9, 102-106). In a Norwegian study, the authors concluded that, for a substantial share of unemployed people, disability benefits often act as substitute (106). It is therefore not unlikely that the people with MD and/or obesity included in this thesis may be over-represented among disability recipients, and underrepresented among those who are unemployed, especially long-term. Sweden is another example of a country with an historically high proportion of disability pensions among groups that are more often absent from work or in long-term unemployment due to health problems or other factors, and thus have a comparatively low unemployment prevalence. Second, although the ICF framework may be considered the most comprehensive model for understanding the disability process, Sweden has been unable so far to incorporate this framework into its social welfare system. Most often, disability is considered in the context of a medical model (11), so estimates of disability benefits may be underestimated, more often reflecting people with MD solely for “biological” reasons (107-109). For example, the Social Insurance Agency in Sweden has more often awarded disability pension to individuals with a reduced work capacity associated with a medical diagnosis (100).

#### **1.5.2.3 Disability pension**

As previously mentioned, disability pension is one of the benefits included in the social insurance program, and constituted around 0.8 % of GDP in 2015 (Figure 5) (101). It offers financial support, and is meant to help people continue working in the unfortunate event when an accident or disease should make them unable to do their job for a period of time. Disability pension can cover 25, 50, 75 or up to 100 % of financial losses due to reduced work capacity, and consists of two types of compensation: one is income-related, the other is guaranteed. The latter is for people who do not hold a job, and who do not have an income of any kind. Guaranteed compensation in 2015 was around 900 euros per month (101).

For precisely a century ago in 1916, the first work-related insurance was introduced in Sweden. Since then, the legislation on disability benefits (including disability pension) has changed frequently and has often revolved around questions asking who should be entitled disability pension, and for what reason (100). From 2003, disability pension has been granted to individuals, between 30-64 years, with at least 25 percent reduced work capacity due to a disease. Since 2008, the Swedish government introduced “*the rehabilitation chain model*”, which is a legal process evaluating work eligibility, and is carried out by the Social Insurance Agency in collaboration with the employee, the employer, the Public Employment Services, and the National Board of Health and Welfare (9). With the introduction of the rehabilitation chain, disability pension can only be granted by the Social Insurance Agency after a permanent reduction in a person’s work capacity has been confirmed; thus

removing the possibility of temporary disability pension (9). Further, by also introducing various employment programs, especially for people with disabilities, the Swedish government hope to reduce the comparatively high rates of newly awarded disability pension in the country (9). Indeed, since the end of the financial crisis, disability pension has been paid out less frequently, and with almost half of the amount spent as a proportion of GDP in 2015 compared with 2009 (Figure 5) (101).



**Figure 5.**<sup>1</sup> Illustrates how national GDP (blue line) has changed from 2007 to 2015, together with how the social insurance (orange line) and disability pension costs (green line) has changed over the same period. Negative growth means that the GDP is declining from one year to the next which is indicated by the negative numbers on the Y-axis. The figure also shows the employed people aged 16-64 in the Swedish work force (as percent of the total population). The high amount of GDP spent on the social insurance during the financial crisis declined rapidly, and after 2009 it continued to decrease. At the same time, the proportion of people in employment has remained fairly constant despite an increasing population. Although, spending on disability pension has decreased by almost 7 % since the end of the financial crisis despite increasing growth in GDP.<sup>1</sup> The Statistics are calculated using data from the Statistics Sweden database, <http://www.scb.se/am0401> and from the Social Insurance Agency (101).

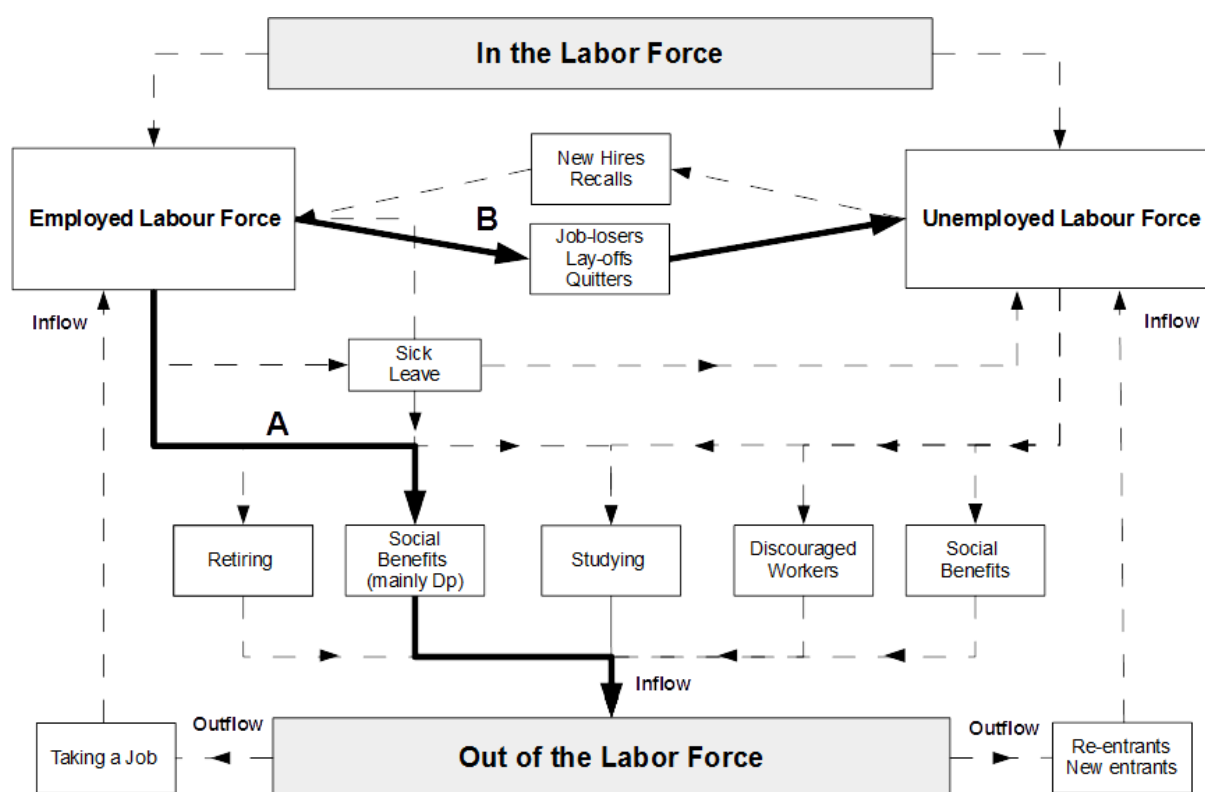
#### 1.5.2.4 Unemployment and the Swedish work force

Statistics Sweden is responsible for measuring and reporting the unemployment in the population i.e. the proportion (reported as a percentage) of people who can work, but is not currently employed or who have not found any work despite actively searching for one. Statistics Sweden conducts population-based surveys eight times per year, called the Labor Force Surveys (the LBS), which include questions about the present work situation, and are administered to people between 15 and 74 years of age..

Information on unemployment prevalence is of key importance, and will aid decision makers in making necessary and efficient policy and legislation which can improve the overall work participation among the population. Since 2005, the unemployment in Sweden is compared with international labor statistics using an international definition of unemployment according to the rules and guidelines of the European Union (10). The definition

distinguishes between being part and not being part of the work force. Unemployed people still belong to the work force together with those who do work (defined as working at least 1 hour per week). People who are not in the found in the work force are those who are retired, who are studying full-time and who have not applied for a job, or who are too sick to work.

In the fourth study of this thesis exploring work participation among people with MD and obesity, information on unemployment was taken from the Longitudinal Integration Database for Health Insurance and Labor Market Studies (LISA) (110). The LISA database retrieves information on unemployment in the population by Swedish Public Employment Services, where people recorded as unemployed if they use their services to find work or if they apply for unemployment benefits.



**Figure 6.** A conceptual model illustrating potential pathways on the Swedish labor market. The pathways result in a dynamic state where people enter or exit the labor force. This thesis focuses on pathway A and pathway B. Pathway A illustrates a hypothetically employed person leaving the labor force prematurely through disability pension (Dp). Pathway B illustrates a hypothetically employed person who is being laid off, or who is terminating an employment contract voluntarily (quitting). These two pathways are believed to apply more often among people with MD and/or obesity compared with people without these conditions.

## 2 AIMS

The overall aim was to study participation in various domains of life in our welfare society, such as social and working life, among adult people with MD and/or overweight/obesity compared with those with one or none of these disabilities.

Specific research aims were:

- To explore whether there were differences in social capital between normal-weight, overweight and obese people with or without MD over a period of 8 years. **(Study I)**
- To investigate whether people with MD and/or obesity had higher job strain than people without these conditions. **(Study II)**
- To investigate whether people burdened with both MD and obesity were at increased risk of disability pension compared with people with one (MD only or obesity only) or neither of these conditions. **(Study III)**
- To examine whether people burdened by MD and obesity are at increased risk of unemployment compared with individuals with one or none of these conditions. **(Study IV)**

### **3 MATERIAL AND METHODS**

Data was retrieved from two large but different information sources: the Stockholm Public Health Surveys, and the National Survey of Living Conditions. Data from these sources were linked to data obtained from national registers: the Register of Sick Leave and Disability Pension (STORE), the Cause of Death Register, the Immigration Register, and the Longitudinal Integration Database for Health Insurance and Labor Market Studies (LISA) (110). The study populations comprise men and women of working age (18-64 years) who live in Sweden. In Table 1 an overview is given of the four studies of this thesis, including the main results, and the material and methods used.



TABLE 1. OVERVIEW OF THE FOUR STUDIES					
	STUDY I	STUDY II	STUDY III	STUDY IV	
TITLE	The impact on social capital of mobility disability and weight status: the Stockholm Public Health Cohort	The association of mobility disability, weight status and job strain: a cross-sectional study	The association of mobility disability and weight status with risk of disability pension: a prospective cohort study	The association of mobility disability and obesity with risk of unemployment in two cohorts from Sweden	
MAIN RESULTS	Indication of a double burden of MD and obesity on social capital over time	Indication of a double burden of MD and obesity on job strain	No apparent double burden of MD and obesity on the risk of disability pension	No apparent double burden of MD and obesity on the risk of disability pension	
DESIGN	Prospective cohort study with repeated measurements	Cross-sectional study	Prospective cohort study	Prospective cohort study	
				COHORT 1	COHORT 2
STUDY SAMPLE	19 128 men and women aged 18-64	29 679 men and women aged 25-64	50 015 men and women aged 19-64	40 088 men and women aged 19-64	39 947 men and women aged 19-64
DATA	Self-reported data	Self-reported data	Self-reported data + register-based data	Self-reported data + register-based data	
EXPOSURE	One question on mobility (full, impaired, or severe), originating from the EQ-5D-3L instrument + BMI weight classes	One question on mobility (full, impaired, or severe), originating from the EQ 5D-3L instrument + BMI weight classes	Three questions on mobility (run a short distance, get onto a bus, get up from a chair; yes or no) + BMI weight classes	One question on mobility (full, impaired, or severe), originating from the EQ-5D-3L instrument + BMI weight classes	Three questions on mobility (run a short distance, get onto a bus, get up from a chair; yes or no) + BMI weight classes
OUTCOME MEASURES	A total of 4 survey questions measured aspects of structural and cognitive social capital, put on their horizontal (2 items) and vertical (2 items) dimensions	A total of 7 survey questions measured perceived job strain, including job demands (2 items), job control (3 items), and support at work (2 items)	All-cause and diagnosis-specific disability pension by ICD-9/ICD-10 codes as recorded in the Social Insurance Agency's register	i) Time to first unemployment (at least one day during follow-up) ii) Time to first long-term unemployment (at least 90 days under two consecutive years during follow-up) iii) Mean accumulated days of unemployment per year	
STATISTICAL METHODS	Generalized estimating equations (GEEs)/multinomial regression, relative risks (RRs) with 95% confidence intervals (95% CIs)	Multiple linear regression/ logistic regression, $\beta$ -coefficients and odds ratios (ORs) with 95% CIs	Stratified proportional hazards regression, hazard ratios (HRs) with 95% CIs	Discrete stratified proportional hazards regression/quantile regression, hazard ratios (HRs) and medians with 95% CIs	

### 3.1 DATA

#### 3.1.1 The Stockholm Public Health Surveys

Stockholm County Council conducts the Stockholm Public Health Surveys (Table 2) for purposes such as: health and risk factor surveillance, policy planning, and resource allocation by policy makers, and public health professionals. The surveys comprise area-stratified random samples of the total population of Stockholm County, aged 18-84, where individuals are identified from the Swedish Total Population Register held by Statistics Sweden. The surveys are cross-sectional, but a population-based cohort, the Stockholm Public Health Cohort (SPHC), has been established within the framework of these surveys for research purposes.

Table 2. The Stockholm Public Health Surveys – recruitment and follow-up in cohorts established in 2002, 2006 and 2010

Cohort starting in	Survey 2002		Survey 2006		Survey 2007		Surveys 2010	
	Sample (n)	Respondents n (%)	Sample (n)	Respondents n (%)	Sample (n)	Respondents n (%)	Sample (n)	Respondents n (%)
<b>2002</b>	49 909	31 182 (62.5)			29 876 <sup>a</sup>	23 794 (79.6)	55 587 <sup>b</sup>	19 128 <sup>c</sup> (61.0)
<b>2006</b>			56 634	34 707 (61.3)				24 875 <sup>c</sup> (71.6)
<b>2010</b>							55 341	30 767 (55.6)

<sup>a</sup> Respondents to the health survey in 2002 (n=31 182) made up the original sample. 1 196 persons were found to have died (n=885), to have emigrated (n=311) or missing a valid address (n=110); thus, the final sample consisted of 29 876 persons.

<sup>b</sup> Respondents to the health survey in 2006 and/or 2007 (n=58 501) made up the original sample. When creating the sample, 1 000 persons were discovered to have participated in both the health surveys (because of a lack of co-ordination during the sampling procedure in 2006), which resulted in an actual sample of 57 501 persons. Further, 1 914 persons was found to have died, to have emigrated or missing a valid address, thus the final sample consisted of 55 587 persons.

<sup>c</sup> The sum of the 19 128 persons who participated in all three surveys, 2002, 2007, and 2010 (Cohort 1), and the 24 875 persons who participated in the 2006, and 2010 surveys (Cohort 2; n=44 003) is lower than the total number of respondents, since 1 000 persons participated in both cohorts

#### 3.1.2 The National Survey of Living Conditions

The National Survey of Living Conditions (ULF) has, since 1975, been conducted annually by Statistics Sweden. It includes questions about the general health, education, occupation, and living conditions of the Swedish people. During 1975-1979 the survey was conducted for people aged 16-74; during 1980-2001 the age range was increased to 16-84; and since 2002 there is no upper age limit in ULF. Since 2007, the main survey method changed from face-to-face interviews to interviews by telephone and, from the start of 2008, ULF was integrated with the EU Statistics on Income and Living Conditions (EU-SILC) and is now called ULF/SILC. Essentially, by simple random sampling of the Swedish adult population aged 16 and older, around 12 000 to 13 000 persons are now chosen and interviewed by telephone over a two-year period (111).

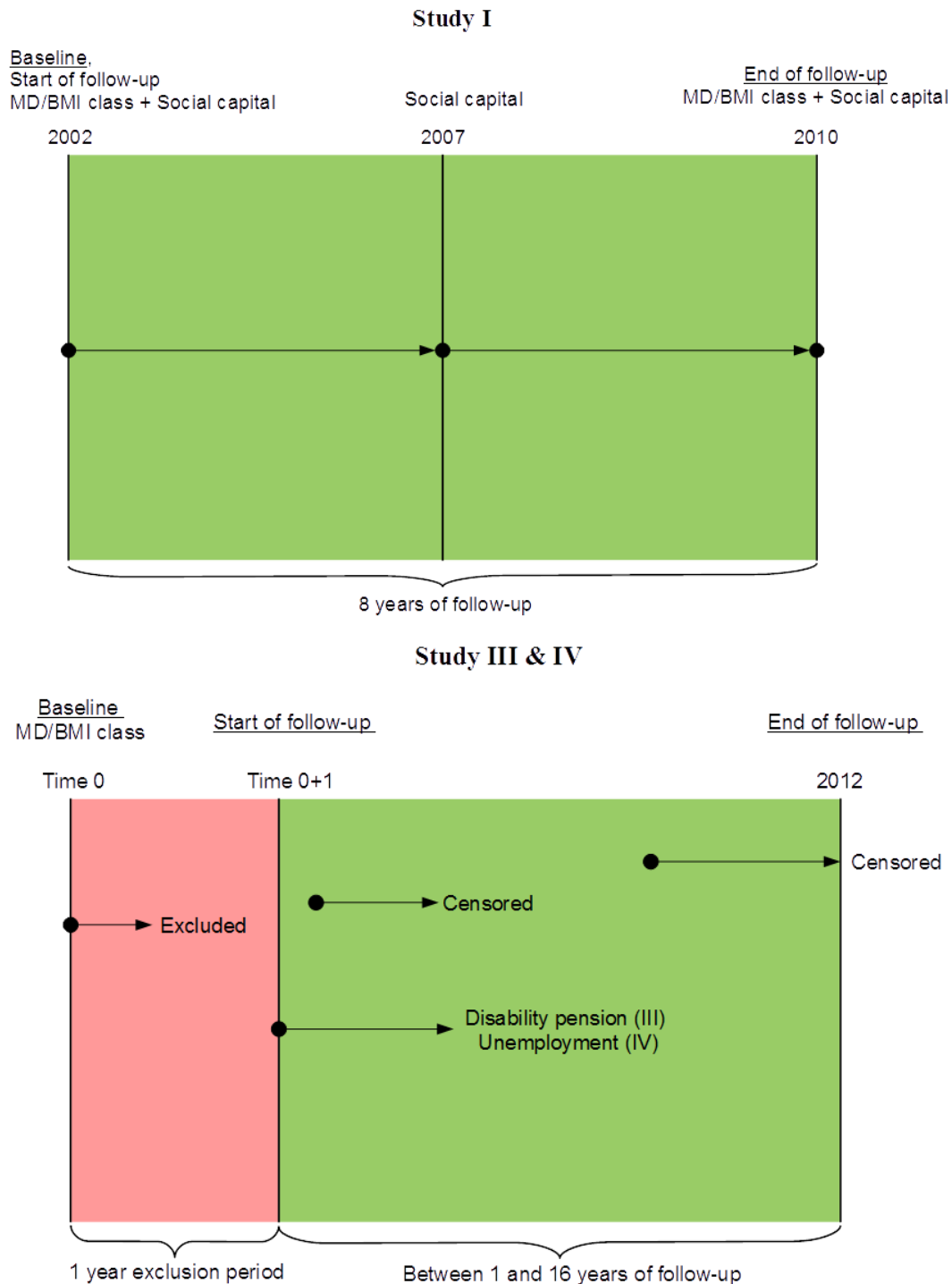
#### 3.1.3 National Registers and Databases

Data used in the third and fourth study were also obtained from extensive record-linkage of registers held by several authorities: Statistics Sweden, the Swedish Social Insurance Agency,

the National Archives and Recruitment Agency, and the National Board of Health and Welfare. Individuals were identified in the Multi-Generation Register, which includes all people registered in Sweden since 1961, and who were born 1932 or later. Information on mortality and emigration were taken from the Cause of Death Register (1961-2012) and the Immigration Register (1961-2012). Information on granted disability pension in the population was obtained from the Swedish Social Insurance Agency (1994-2012). The Longitudinal Integration Database for Health, Insurance and Labor Market Studies (LISA) is a longitudinal database that was constructed in collaboration with several authorities, including Statistics Sweden. Since 1990, the database has been updated annually and holds information from the labor market, educational and social sectors, for all individuals 16 years of age and older who were registered in Sweden as of December 31. Information on unemployment (the outcome in the fourth study) and highest obtained education was retrieved from the LISA database.

### **3.2 STUDY DESIGN AND STUDY POPULATIONS**

Of the four studies included in this thesis, the first, third, and fourth study are longitudinal cohort studies (Figure 7), and the second is a cross-sectional study (Table 1).



**Figure 7.** Illustrating the two prospective cohort designs used in this thesis. The upper part shows the design used in Study I, which uses a repeated-measures longitudinal design. The study population (SPHC) was established in 2002 (baseline), and followed up in 2007 and in 2010 (end of follow-up). Information of MD and weight status was collected at baseline and at the end of follow-up, while information on social capital was collected at all three time points. The lower part of the figure shows the design used in Study III and Study IV. Here, multiple baselines were established depending on when individuals in the study populations participated in a survey (ULF/SILC or SPHS). Individuals were then followed-up in registers until they received the outcome (disability pension or unemployment) at the latest by 2012 the end of follow-up, or for various reasons did not receive the outcome (censored). Information on MD and weight status was collected at baseline. The red area in the lower part of the figure indicates the 1-year exclusion period used to ensure that the exposure came before the outcome.

In the first study, information on exposure (MD and weight status) and outcome (social capital) of the study participants was retrieved on multiple occasions, in 2002 (baseline), in 2007, and in 2010. The follow-up period is 8 years. The study population is men and women living in Stockholm County between 18 and 64 years of age. The final sample included 19 128 people (Table 1).

In the second study, information on exposure (MD and weight status) and outcome (job strain) of the study participants was only retrieved once, at the same time point. The study population is men and women living in Stockholm County between 25 and 64 years of age. The final sample included 29 679 people (Table 1).

In the third study, exposure information was only retrieved once (baseline). The start of follow-up differs for the study participants depending on the year they participated in an ULF survey. The follow-up period varies between 1 and 16 years. The study population is men and women living in the whole of Sweden between 19 and 64 years of age. The final samples included 50 015 people (Table 1).

In the fourth study, two separate cohorts were established. The first cohort was established using the SPHS from 2002 and 2006. The second cohort was established using the ULF surveys from 1996 to 2011. The follow-up period varies between 4 and 8 years for the SPHS cohort, and between 1 and 16 years (1-15 years for long-term unemployment) for the ULF cohort. The study population are men and women living in Stockholm County (SPHS cohort) or the whole of Sweden (ULF cohort) of working age between 19 and 64 years. The final samples included 40 088 and 39 947 people for the SPHS and ULF cohort, respectively (Table 1).

### **3.3 DEFINITIONS**

#### **3.3.1 Exposure groups – combining MD and weight status**

In all of the four studies conducted we used self-reported height and weight were to calculate body mass index (BMI), applying the WHO weight classification system for this purpose (Table 3). People with a BMI equal to 30 and above were classified as being obese. However, MD was defined differently between the studies. The mobility status of the study participants in the first, second, and fourth study (SPHS cohort) was evaluated by a question originating from the EuroQol EQ-5D-3L self-rating scale (112). People were categorized as having MD if they had answered “no” to one of the following two alternatives on the scale “I have some problems in walking about” and “I am confined to bed”.

For the study participants in the third, and fourth study (ULF cohort) we had more information to evaluate their mobility status. Here, we considered people as mobility-disabled if they answered “no” to question i) AND “no” to question ii) OR “no” to question iii) (see questions below).

- i. "Can you run a short distance, around 100 m, if you are in a hurry?"
- ii. "Can you get on and off a bus without experiencing any problem?"
- iii. "Can you take a short walk for about five minutes at a moderately high pace?"

By combining MD and weight status exposures, we created six exposure groups at baseline for each study as follows: normal weight without MD (reference), normal weight with MD,

overweight without MD, overweight with MD, obese without MD, and obese with MD. The last group include people burdened by both MD and obesity, which was the main exposure of interest throughout the four studies.

### **3.3.2 Outcome measures – Social capital, Job strain, Disability pension, and Unemployment**

In the first study, social capital was considered at the individual level according to the theory of Bourdieu and Portes (Figure 3). However, the results were also still aggregated to reflect the social capital of each exposure group. Further, social capital was considered at both the structural and cognitive level. At the structural level, one question was operationalized as social participation on a horizontal (or egalitarian) dimension, and measured bonding social capital. Another question was operationalized as social (civic) participation on a vertical dimension, and measured bridging social capital. At the cognitive level, interpersonal trust was operationalized and measured on both the horizontal dimension (trust in people in the neighborhood) and the vertical dimension (trust in authorities, institutions, and politicians).

In the second study, psychosocial stress in the work environment was considered through the demand-control-support model (Figure 3). Seven questions in total were retrieved from the SPHS reflecting job demands (two questions), job control (three questions), and support at work (two questions). The demand and control questions were used to operationalize job strain, according to different approaches to strain, using different measures.

In the third study, information on disability pension due to a medical diagnosis according to the ICD-9/ICD-10 was retrieved from a national high-quality register, held by the Social Insurance Agency. We only considered people with awarded disability pension reflecting full financial compensation due to 100% work incapacity.

Finally in the fourth study, information on unemployment was retrieved from the LISA database. The specific variable includes the number of days an individual had been unemployed according to the register of the Public Employment Service. Using this information, three outcome measures were defined: time to first unemployment event (at least 1 day); time to first long-term unemployment event (at least 90 days or more over two consecutive years), and the average unemployment days per year (Table 1):

## **3.4 STATISTICAL ANALYSIS**

### **3.4.1 Statistical methods used in Study I**

We used generalized estimating equations (the *xtgee* command in STATA) to calculate relative risks (RRs) and 95% confidence intervals (CIs) for the participation aspects of social capital: “participation in social activities”, and “voting in elections”. We used multinomial regression models (the *mlogit* command in STATA) to estimate RRs with 95% CIs to analyze trust aspects of social capital: “trust in individuals” and “trust in authorities”. The models enabled us to establish whether patterns of social capital differed over time between the study groups and the reference group (normal weight people without MD in 2002). To account for confounding, all models were adjusted for age, sex, country of birth, and education. We also explored whether obese and MD groups had a higher risk of a negative development in social capital over time compared with individuals with just *one* condition (MD or obesity).

### **3.4.2 Statistical methods used in Study II**

The main analysis consisted of multiple linear regression (the *regress* command in STATA) to compare mean differences in job strain between the study groups and the reference group (normal weight people without MD). Logistic regression (the *logit* command in STATA), with associated odds ratios (ORs) and 95% CIs was used for the categorical task of calculating and comparing job strain between the study groups and the reference group. Differences in job strain between obese and MD groups and groups with just *one* condition (MD or obesity) were also explored.

### **3.4.3 Statistical methods used in Study III**

A stratified Cox proportional hazards model (the *cox* command in STATA), with associated hazard ratios (HRs) and 95% CIs, was used to examine differences in relative risks of disability pension between the study group and the reference group (normal weight people without MD). Follow-up started after participation in the ULF/SILC survey (at earliest 1996) and ended on the date of awarded disability pension or censoring at the date of retirement at the age of 65, emigration, death, or at the end of follow-up (31 December 2012), whichever came first. Log-log plots and Schoenfeld residuals were used to assess the proportional hazards assumption. Post-estimation tests were also performed to check for differences between the obese and MD groups and those with just *one* condition (MD or obesity).

### **3.4.4 Statistical methods used in Study IV**

For outcomes i) and ii), a discrete-time stratified proportional hazards model was used (information on unemployment was recorded annually) to examine differences in hazard ratios (HRs), with 95% confidence intervals (95% CIs), between exposure groups and the reference group (normal weight people without MD). Follow-up started the year after participation in an ULF/SILC survey (at earliest 1996) or an SPHS, and ended the year of first time or long-term unemployment or if censored (see statistical method for Study III). A similar stratification procedure and test for proportionality was performed as in Study III.

For outcome iii), we used quantile regression to estimate median (95% CIs) unemployment days per year during follow-up, and Poisson regression with robust variance to estimate relative risks (RR) and 95% CIs for being, on average, unemployed more than 30 days per year.

### **3.4.5 Additional analyses**

#### **3.4.5.1 Post-estimation comparisons**

Additional analyses were performed in the second, third, and fourth study. These were post-estimation comparisons using Wald tests (the *lincom* and *test* commands in STATA). Essentially, from the fully adjusted model we compared the group with MD and obesity (double exposure) with the normal weight group with MD (single exposure) or the group with obesity, but without MD (single exposure). This was done to explore whether MD or obesity was dominant in the association under study.

## **3.5 ETHICAL CONSIDERATIONS**

### **3.5.1 Confidentiality and handling of data used in the SPHC**

In 2002, an information letter was posted to eligible study participants living in Stockholm County about the background and the purpose of the survey, and that the survey was conducted in collaboration with Statistics Sweden and Stockholm County Council. Further, the letter informed participants about how Statistics Sweden collects and handles sensitive information, such as on education, income, family background, and medical history, and that all information is protected by the Personal Data Act. The letter also stated that Stockholm County Council was only entitled to encoded information about the participant, i.e. the information could not be traced back to them, should they chose to participate. By answering and returning the survey, the participants gave their informed consent for Statistics Sweden to handle and administer information about them. Apart from the information letter, a process of confidentiality has been issued within Statistics Sweden regarding the administration and consignment of register information. An agreement on how the encoded information from the surveys can be used has also been established between Statistics Sweden and the Stockholm County Council as a last measure, and the process has been filed by Statistics Sweden's judiciary secretariat.

### **3.5.2 Confidentiality and handling of data used in the ULF**

Information about confidentiality and handling of data in ULF/SILC is conveyed similarly as for the SPHC. Before the interview takes place, the respondent has been informed (either by mail or by the interviewer) on how Statistics Sweden are collecting, processing, storing the data according to The Public Access to Information and Secrecy Act (OSL), and The Personal Data Act. Results are presented exclusively at group level to minimize the risk of exposing any specific person living in Sweden.

### **3.5.3 Risks versus public health benefits**

The research project provides a unique longitudinal perspective on people's with MD and/or obesity participation in their communities and on the labor market in comparison with large representative groups of men and women without such conditions. Record linkage of registers have been made by Statistics Sweden, and after this procedure the personal identification numbers were erased by this public body. It is therefore either possible or needed to contact about the very large numbers of participants for informed consent. The studies used only registers with encoded data i.e. data without personal identification numbers (PIN). The so called PIN key is held solely by Statistics Sweden.

Despite the mentioned risks, we believe that the results generated from these studies are of great interest to society, and although the results do not provide any benefits or risks in the short term for the participants, the results are in the long term expected to lead to better life quality, and increased participation for people with MD and obesity. All results will be reported at group level in international papers. Finally, the Ethical Review Board at Karolinska Institutet has reviewed and approved our research plan for this project.



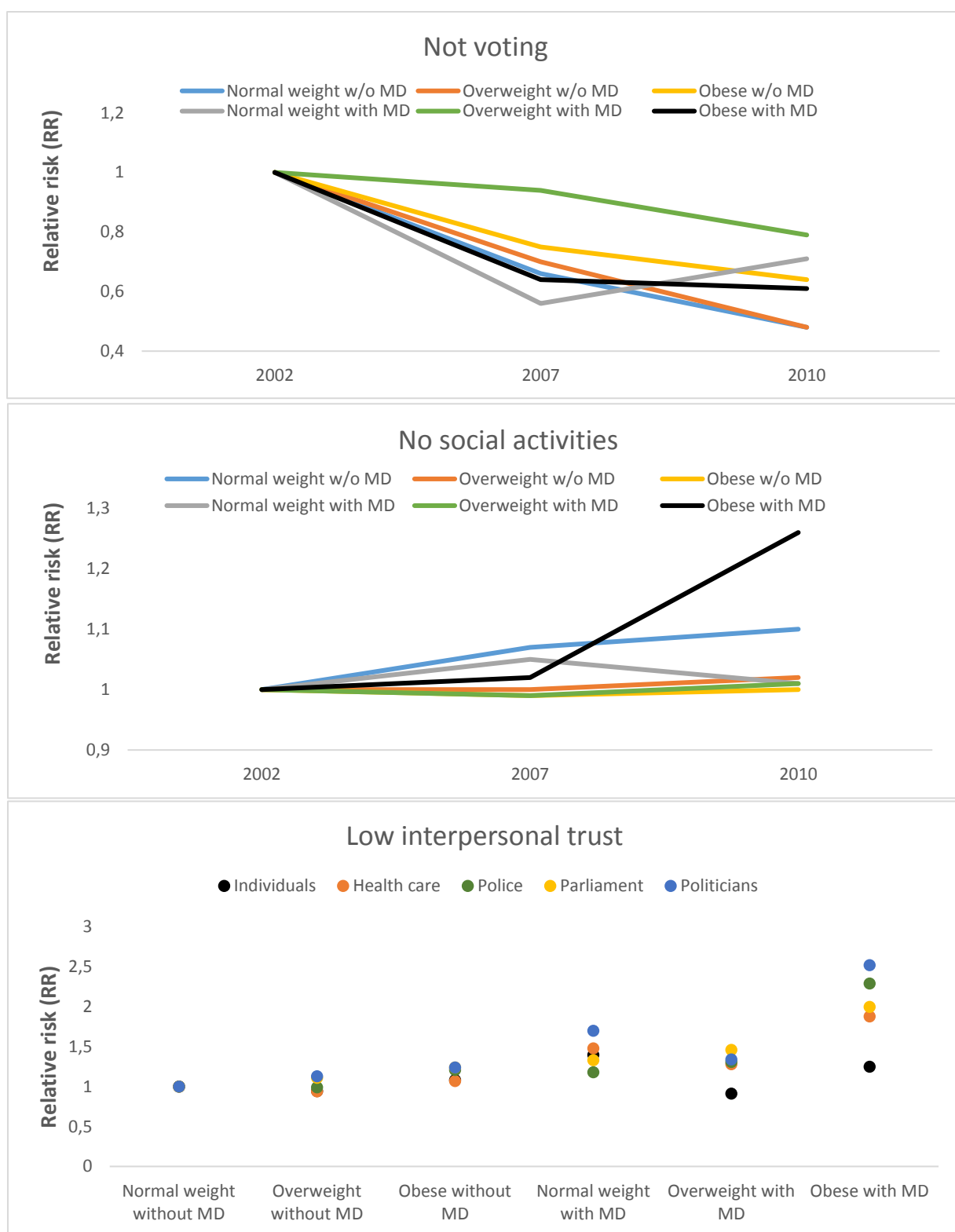
## 4 RESULTS

This section will start with an overview of the results of each of the four studies.

### 4.1 MAIN RESULTS OF STUDY I

The first study is a prospective cohort study based on the SPHC, and included 19 128 individuals (response rate = 61.0% from baseline in 2002), aged 18-64, who responded to the three health surveys in 2002, 2007, and 2010 (Table 1). In the cohort, we identified 516 individuals who had reported mobility disabilities in both 2002 and 2010. People with MD were more often female, older, non-Swedish, and with a lower education. In general, they had lower social capital than people without MD, especially cognitive social capital (Figure 8).

After considering the confounding effects of age, sex, country of birth, and highest obtained education, the results indicated that people burdened by both MD and obesity had the highest risk of lower participation in social activities over time (RR=1.26: 1.06-1.50). Further, voting behavior increased over time for all groups, but we found no statistically significant evidence of a difference in voting behavior between groups. Neighborhood trust remained fairly unchanged for all groups over time. However, we found that the level of trust in several authorities and institutions declined over time, especially among the mobility-disabled groups (RRs: 1.13-2.52, 95% CIs: 1.02-3.94). Little evidence was found to support an increase in general trust over time in any of the study groups.



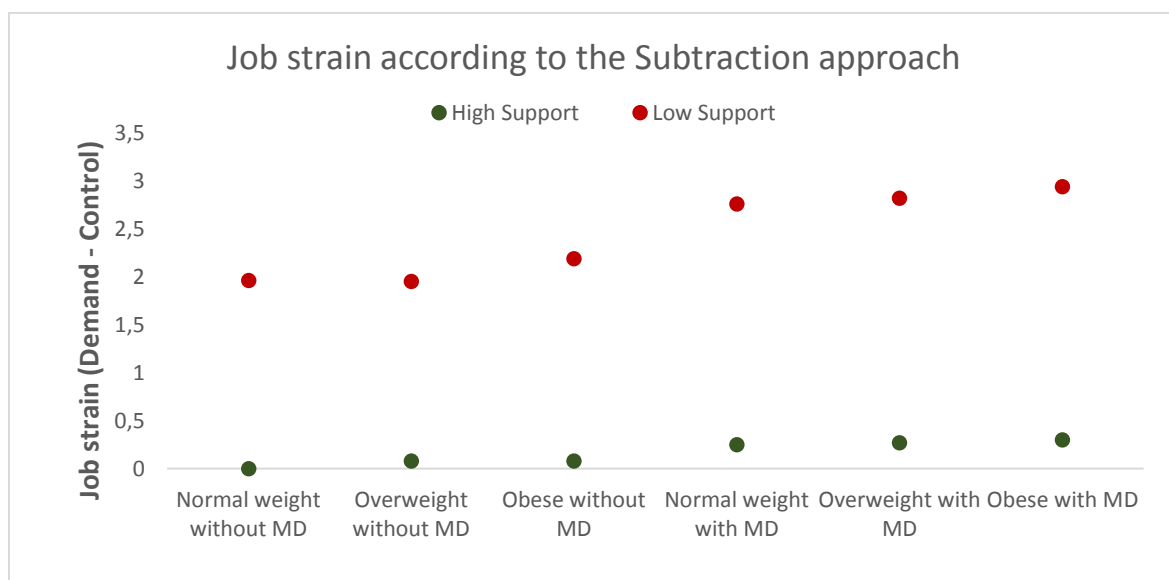
**Figure 8.** Illustrating the development of social capital, i.e. activity involvement (the upper part), voting behavior (the middle part), and interpersonal trust (the lower part) over an 8-year period for the study groups. Activity involvement and voting behavior are shown as the adjusted relative risks of not doing these activities compared with people without MD and of normal weight in 2002 (the reference group). Interpersonal trust is shown as the adjusted relative risk of not trusting individuals in the neighborhood, or in authorities and politicians, between the study group and people without MD and of normal weight (the reference group). Associated confidence intervals are not shown in the figure.

## 4.2 MAIN RESULTS OF STUDY II

The second study is a cross-sectional study based on individuals who responded to a SPHS in 2006 or 2010. In total, 29 679 people between 25-64 years of age comprised the study sample (Table 1). We identified 2036 individuals with MD, of whom 515 were also obese. People with MD were more often female, older, and born outside Sweden, had lower education, had lower socio-economic position, and had lower social support at work than those without disability.

Regardless of the approach to strain used, we found that people burdened with both MD and obesity had the highest job strain, reflecting higher demand and lower control than for any other study groups. The study findings were robust even after taking confounding of socio-demographic factors into account.

Social support at work had a statistically significant modifying effect ( $p < 0.001$ ) on the studied association. High social support had a protective effect on job strain, and low support had a worsening effect on job strain. In similarity with the first study, MD contributed more to job strain than weight status (Figure 9).



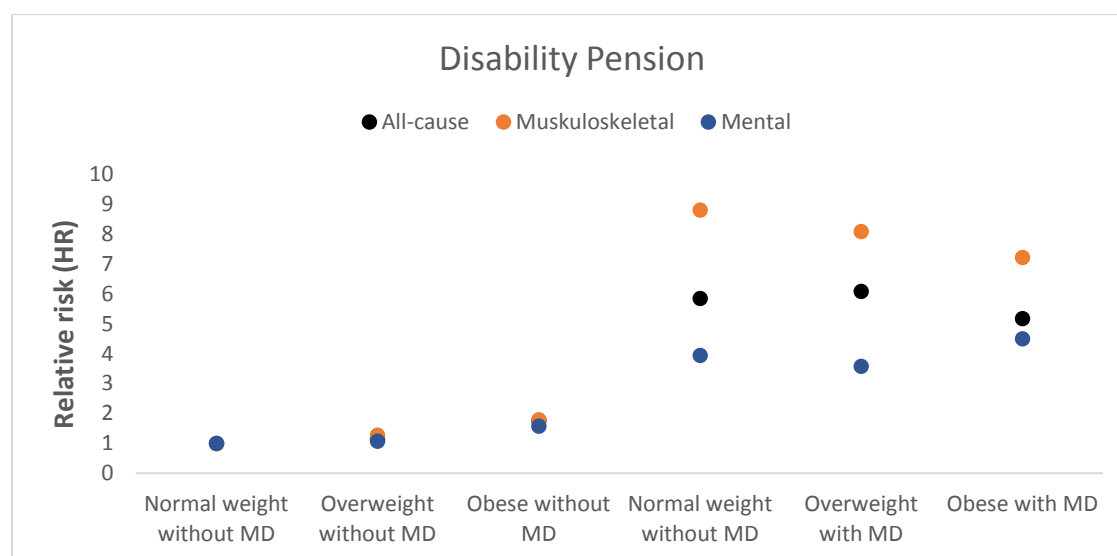
**Figure 9.** Illustrating the adjusted mean job strain scores (self-perceived demand minus control, the Subtraction approach), stratified by social support at work (collegial and supervisor support), between the study group and people without MD and of normal weight (the reference group). Associated confidence intervals are not shown in the figure.

### 4.3 MAIN RESULTS OF STUDY III

The third study is a prospective cohort study. The study sample comprised 50 015 men and women of working age (19-64 years-old) identified in ULF/SILC surveys conducted between 1996 and 2011, and were followed up in the STORE database in terms of disability pension.

We identified 4575 (9.2%) individuals with obesity, and 550 (1.1%) individuals with MD. At baseline, people with MD were more often women, older, born outside Sweden, lower educated, had more often disability benefits at baseline or before attainment of disability pension, and were more often unemployed (Table I). The groups with MD had higher incidence rates of disability pension compared with the groups without MD.

A total of 2310 (4.6%) individuals were granted disability pension, with a mean follow-up time from baseline to disability pension of 7.2 (SD 4.5) years. Accounting for socio-demographic factors and other disability benefits at baseline, we found that people with MD had a higher risk of disability pension (of any sort) compared with the reference group (normal weight people without MD). Similar findings, but of a larger magnitude, were found for disability pension due to musculoskeletal diagnoses. Concerning disability pension due to mental disorders, it appeared that people with MD and obesity had the highest risk compared with the reference group. However, overall, no indication of a double burden of MD and obesity with risk of disability pension was found in this study.



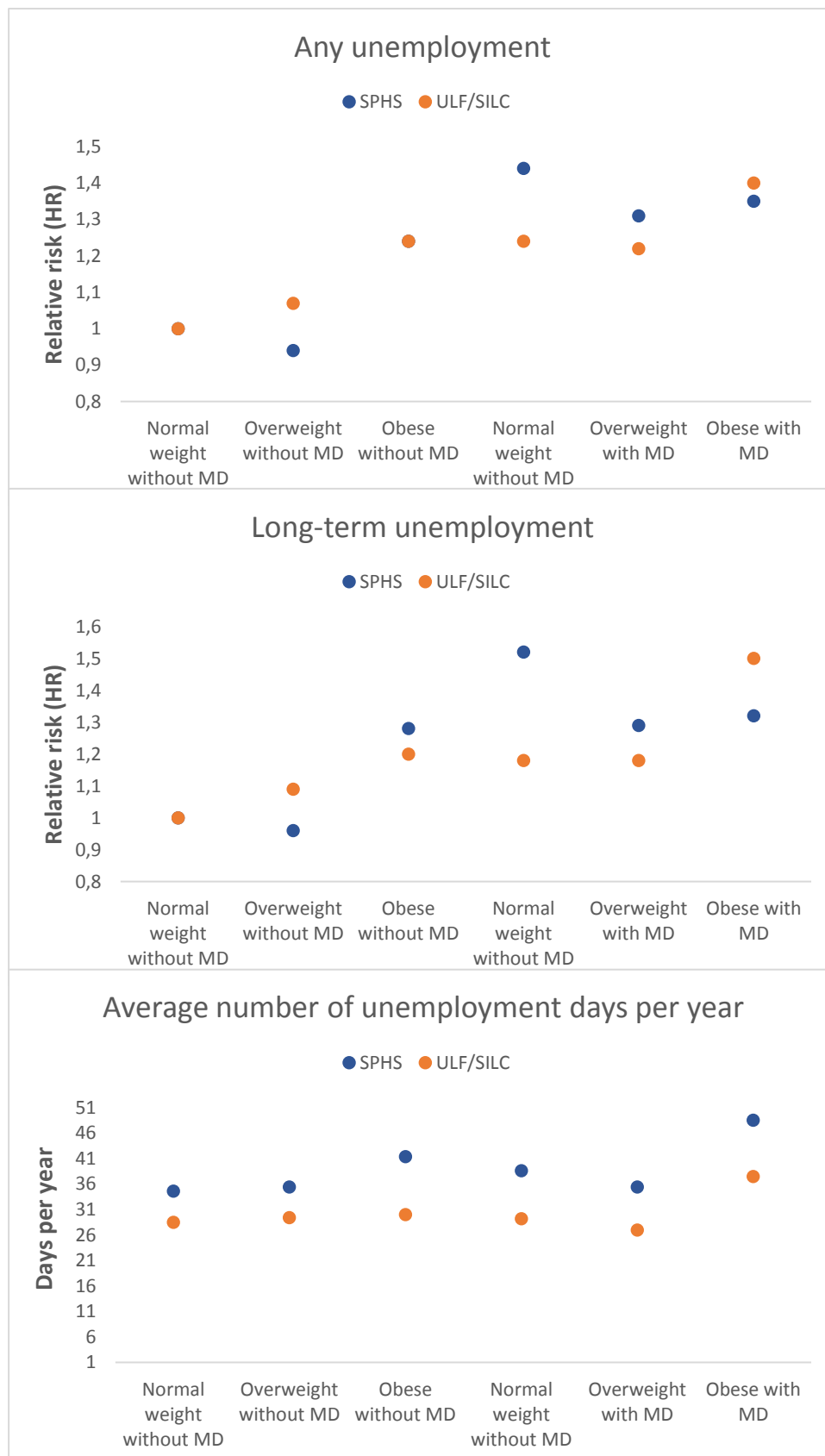
**Figure 10.** Illustrating the relative risk (HR) of all-cause and cause-specific disability pension between the study group and people without MD and of normal weight (the reference group). Associated confidence intervals are not shown in the figure.

#### **4.4 MAIN RESULTS OF STUDY IV**

The fourth and final study is a prospective cohort study. In this study we explored unemployment levels within and between two cohorts: the ULF/SILC (39 947 individuals) and SPHS cohort (40 088 individuals), including men and women of working age (19-64). Obesity prevalence was around 9% in both cohorts. However, the prevalence of MD in the ULF/SILC cohort was 2.5%, which was half that found in the SPHS cohort. Similar to the population characteristics of the first three studies, people with MD were more often women, older, and had lower socio-economic status compared with members of the groups without MD. Notably, in the SPHS cohort, the proportion of people born outside Sweden was much higher in groups with MD than in those without.

The mean follow-up period was slightly longer for people belonging to the ULF/SILC cohort, at 5.7 years (SD = 4.2 years) compared with 4.9 years (2.2) for the SPHS cohort. Around 27% of the people in the ULF/SILC cohort were unemployed at least once, with 19% being long-term unemployed. In the SPHS cohort, the corresponding figures were 17% and 10%, respectively.

Results from the fully adjusted analyses show that all study groups in both cohorts (except the overweight without MD group in the SPHS) had higher relative risk of any unemployment spell compared the reference group (with normal weight people without MD). Regarding long-term unemployment, all study groups in the SPHS cohort, except the overweight without MD group, had higher relative risk compared with the reference group. In the ULF/SILC cohort statistically significant differences in relative risk compared with the reference group were found in the overweight and obese group without MD, and the double-burden groups. Further, in both cohorts, people burdened with MD and obesity had the highest average number of unemployment days compared with the reference group. They did not, however, differ from the other groups with MD in a statistically significant way.



**Figure 11.** Illustrating the relative risk (HR) of any ( $\geq 1$  day), or long-term unemployment ( $\geq 90$  days over 2 consecutive years), and the average (median) number of unemployment days per year between the study group and people without MD and of normal weight (the reference group). Associated confidence intervals are not shown in the figure.

## 5 DISCUSSION

### 5.1 BRIEF SUMMARY OF THE MAIN FINDINGS

People burdened with MD and obesity did not differ in voting behavior or activity involvement over time compared with normal weight people without MD. However, we found significant differences between the two groups regarding change in trust in authorities, institutions and politicians. People burdened with MD and obesity had higher job strain than normal weight people without MD. Social support at work was found to be an important effect modifier. People burdened by MD and obesity had a much higher risk of disability pension, and higher risk of being unemployed, both short- and long-term, compared with normal weight people without MD. For all the investigated outcomes in this thesis, we found no statistically significant difference between people with MD and obesity and the other groups with MD.

### 5.2. SOCIAL PARTICIPATION AND INTERPERSONAL TRUST

Social capital was used to reflect aspects of social participation (activity involvement and voting behavior) and interpersonal trust (in neighbors or authorities and politicians) among people with MD and obesity. The results show no evidence of a changed difference over time in social capital between people with MD and obesity and people without these conditions (113). In other words, the gap in social participation observed at baseline between these groups seemed to remain 8 years later.

We are not aware of any other longitudinal study that has investigated the social participation and interpersonal trust of people burdened by MD and obesity. Most research on the topic has been done on people experiencing MD at a single time point. For example, previous studies from Sweden, the United Kingdom, and Ireland show that people with MD (measured by questions on mobility) reported lower participation in social activities, such as in clubs, organizations, or religious worship (40, 114, 115). Studies that include more specific adult populations with MD, such as people with spinal cord injury (116), rheumatoid diseases (117, 118), or other mobility impairments (119), reported similar findings. In terms of voting, results from cross-sectional studies show that people with disabilities are less likely to vote in elections compared with people without disabilities (120-123).

A possible explanation for why this gap in social participation has remained lies in persisting differences in health, such as cardiovascular disease, chronic pain, or depression, with more health problems experienced by people with MD and/or obesity than people without these conditions (20, 25, 27, 42, 51, 52). Persisting health inequalities between these groups may reflect a small (or no) difference in their socio-economic status over time (4, 9, 105, 124-128). In other words, the low educational level of people with MD and obesity makes them more likely, than those without these conditions, to be employed in insecure short-term jobs associated with high work-related stress and lower income, which may act as a barrier to equal social participation.

Yet another possible explanation for persisting differences in activity involvement, and in voting behavior, between people with MD and obesity and people without these conditions, are remaining barriers due to the environment, including the natural and built environment and infrastructural barriers (29, 121, 129-132). For example, people with MD and/or obesity may

experience barriers to participation in social events, sports or health clubs, or in voting, because of problems getting to and/or accessing the facilities. As well as physical obstacles, negative attitudes in the general population may lead to stigmatizing and discriminating behaviors towards people with MD and obesity, thus acting as invisible barriers to the social participation of these individuals (29, 133)

Further, our findings did not support a significant difference in neighborhood trust over time between people with MD and obesity and people without such conditions (113). We are not aware of previous research investigating interpersonal trust among people with MD and/or obesity. However, there has been much research conducted on factors promoting or eroding trust in general adult populations of men and women within neighborhoods or larger communities (68, 134-139). One conclusion to be drawn from these previous studies is that both individual and neighborhood socio-economic status will strongly influence the likelihood of people participating in voluntary organizations or social activities. Such participation may in turn build interpersonal trust, and positively shape attitudes, beliefs and tolerance between people of different racial/ethnic backgrounds. Another conclusion is that the socio-demographic context of an area and the political ideology of a country may influence interpersonal trust. For example, within a neighborhood, high ethnic diversity, a high level of unemployment, and high crime incidence may invoke fear and distrust among residents, thus discouraging higher levels of neighborhood attachment and social interaction. At the macro level, welfare societies, such as Sweden, may invest more financial resources in public welfare, which might possibly promote neighborhood trust with higher social cohesion within local communities (68). In our study, we followed men and women from the Swedish work force living in Stockholm County. We would, therefore, like to argue that relative stable contextual (both physical and social) and/or individual characteristics (socio-economic status) underlie our observation of no difference in change in interpersonal trust over time between the groups.

In contrast to neighborhood trust, trust in authorities and politicians decreased over time for people with MD and obesity, compared with the normal weight people without MD (113). It is possible that comorbidities, lower socio-economic status, and the physical and social barriers perceived by people with MD and obesity eroded their trust in authorities and politicians to a greater extent than among people without these conditions. The people in our study with MD and obesity also reported less trust in the health care system than those without these disabilities. A previous study has shown that people with disabilities are more likely to report that they have not received adequate health care (140), and most likely to have higher health care expenditures (141). Another study reported that people with disabilities perceive many environmental barriers to attaining adequate health care from their health care providers, including transportation, and a general lack of knowledge of their disability by physicians (142). Environmental barriers, high personal costs due to frequent visits, and perceived low quality of care may have decreased trust in the health care system among people with MD and obesity in our study.

In Study I, people with MD and obesity showed consistently lower trust in politicians and the parliament than people without MD or obesity (113). During the period that the study participants reported on their level of trust (2002 to 2010), a financial crisis occurred. In economic downturns, higher unemployment usually follows, especially among people with disabilities (105). It is possible that low trust in politicians among people with MD and obesity



partly reflects the higher levels of unemployment and poorer labor market attachment during the financial crisis than among people without MD and of normal weight (4, 9).

### **5.3 PARTICIPATION IN WORKING LIFE**

Results from Study II, Study III, and Study IV show that people burdened by both MD and obesity are less likely successfully to establish themselves on the labor market due to harsher working conditions with lower levels of support, and because of a shorter amount time being in the work force compared with people without these disabling conditions. These findings are in line with the previous literature (4, 9, 29, 53, 79-82, 143-145). Considered in the context of the ICF framework, many interpretations are possible, but in this thesis the focus is mainly on inequalities in health and differences in socio-economic status between people with MD and obesity and those without. Additionally, some environmental factors that may create physical and social barriers are discussed.

#### **5.3.1 The work environment**

Few studies have focused on the work environment in people with MD and obesity. We found that they were more likely to experience high job demands and low job control compared with people without MD and obesity (146), thus being at risk of stress associated with cardiovascular disease. Our findings are partly in line with a study from the USA, which showed that people with disabilities experienced lower job control, less opportunities for advancement, and lower levels of supervisor and collegial work support, compared with people without disabilities (147). Another study, however, in contradiction to the results in this thesis, found that people with MD do not report worse psychosocial demands or lower control compared with people without MD, although individuals with MD seem to have less rewarding jobs (148). However, this study, from the USA, did not focus on comparing job strain or social support at work between the groups of their study.

The additional burden of health problems experienced by people with MD and obesity (42) may induce pain, fatigue or mental problems (82, 149-151) which may contribute to negative perceptions of their work environment. Further, the results of this thesis show that people with MD and obesity have fewer years of education than people without these conditions, making them more likely to be employed in insecure, often time-limited, and low paid jobs (referred to as contingent or precarious work). Indeed, there are some studies showing that people with MD, and other disabilities, are over-represented in these kinds of jobs (125, 147, 152). Further, these types of jobs are more likely to have non-supportive work characteristics associated with stress and job strain (153).

Interestingly, we found evidence that social support at work has a modifying effect on perceived job strain in all study groups (146). However, our findings indicate that perceived support may be especially important in buffering perceived psychosocial stress among people with MD and obesity. Previous research confirms the importance of support by colleagues and supervisors as an important environmental facilitator of a good work environment among people with disabilities (154).

### 5.3.2 Disability pension and unemployment

Studies III and IV demonstrate that, compared with people without MD and of normal weight, people burdened with MD and/or obesity are more often in need of disability pension, making them more likely to leave the work force prematurely. They are also more likely to be unemployed, and have more unemployment days per year on average. Notably, the relative risks of unemployment in Study IV among people with MD and obesity and those without either of these conditions were found to be similar between a cohort from Stockholm County (SPHS) and a national cohort (ULF/SILC). This indicates that a high risk of unemployment among individuals with MD and obesity is a robust finding across studies, despite some differences in population composition and the criteria for identification of MD.

As previously mentioned, there are numerous individual and external factors that may explain the large and remaining gap in work participation observed between people with MD and obesity, and people without these conditions. Among the most investigated are health inequalities, socio-economic differences, and stigmatization processes. In our studies, many participants in the groups with MD (including those in the double-burden group) reported some kind of long-term health problem. Poor health has a clear link to early exclusion from the labor force among general working populations (155, 156). It is therefore a limitation of the studies in this thesis that information on long-term health was not included in our statistical analyses. The reasons lie in less good quality of this information, combined with the need for complex mediation analyses due to high correlations between long-term health problems, MD and obesity.

Considering disease or health condition, including its severity, type and duration, as the condition underlying MD and obesity, and how it influences work participation, may be of importance (157-159). Jensen and colleagues found that the duration of MD was negatively associated with the risk of unemployment (158). Park and colleagues found that the severity of a condition underlying MD increased the risk of being unemployed (159). Considering obesity, there is evidence that duration is an important factor associated with risk of unemployment, especially among women (78, 160, 161).

Further, it is possible that employed people with MD and obesity have better health or coping skills, or stronger social networks than those who are unemployed. However, holding low-paid jobs without proper working adjustments might impose health problems and loss of productivity (162-164), which subsequently may increase the risk of disability pension (165) or unemployment.

Factors in the work environment partly beyond individual control, for example, organizational issues, may influence the work participation of people with MD and obesity (53, 79, 82). People with MD and obesity may need proper work accommodation, including flexible working schedules, and more physical adaptations in order to fulfill their role and work capacity (18). We used socio-economic status to account for some of the confounding effect of these external factors, since socio-economic status is correlated with working conditions and types of work environment (166).

Finally, employer prejudice and stigmatization may also explain part of the unemployment gap observed in Study IV between people with MD and/or obesity and those without these conditions (29, 53). Previous research has found that prejudice and discrimination may act to reduce wages and the chances of promotion among people with MD and/or obesity.

However, no empirical information on stigmatization was available for the current studies. Therefore, it is only possible for us to speculate about its impact on unemployment and disability pension among people with MD and obesity.

## **5.4 STUDY LIMITATIONS**

### **5.4.1 Study design, selection of study participants**

This thesis presents findings from one cross-sectional and three prospective cohort studies. Compared with a cross-sectional design, a prospective design permits conclusions about the temporal and causal direction of the exposure-outcome association, i.e., the exposure both precedes and influences the outcome, not the other way around (reverse causality). In our cross-sectional study, it is unknown whether MD and obesity increases the risk of job strain or if job strain increases the risk of MD and obesity. The cross-sectional design also limits further insight into whether the duration of exposure matters for the development of the outcome.

The study participants included in our studies were not selected and recruited by us, but were instead identified from large databases established from health surveys, which have been responded to by randomly sampled people from the general Swedish population. It was therefore beyond our ability to influence who chose to participate in these surveys. Non-participation in the SPHS (including the cohort) was deemed acceptable compared with other large-scale population-based cohorts (167). In the ULF/SILC surveys, the response rate was a bit lower, and has decreased over the last decade, from 63% in 2000 to 43% in 2013. In general, people of younger ages, who were born outside Sweden, and with a lower educational level were less inclined to respond to the surveys (111, 167). There may be other reasons why some people chose not to respond to the surveys. Nevertheless, non-response can influence the prevalence of the investigated outcomes among the study population. In our studies, it is possible that non-responders also had more health problems than those who responded to the surveys. Thus, we may have underestimated the prevalence of the study outcomes in our samples, since they are related to health. However, it is harder to disentangle how the study groups in our samples differed from the hypothetical study groups among non-responders in terms of the outcomes. Usually, associations are less affected than prevalence estimates, but it is impossible to entirely rule out misclassification bias.

### **5.4.2 Errors in the measurements of the exposures and outcomes**

In all the studies, weight status (BMI) was established from self-reported data on weight and height. BMI is frequently used to estimate obesity levels in epidemiological studies. The measure is prone to bias, often leading to an underestimation of obesity among the study population. However, recent trends indicate that weight bias due to self-reported BMI may be disappearing, perhaps due to more socially accepted views of obesity (168). Objective measures of height and weight, and measures such as bioelectrical impedance and waist circumference (42, 169), would provide more accurate data on obesity among people with MD. Measures not relying on data on height and weight would also be preferable since it might not always be possible to use a stadiometer and a weight scale on people with MD. We may, therefore, have underestimated obesity prevalence in general and the prevalence of obesity among people with MD in our studies.

Further, we used self-reported data from questions on mobility-related activities including “walking with difficulty”, “running a short distance”, “climbing on board a bus”, and “getting up from a chair”. More specific information regarding type, severity and duration of MD were not available to us, which may have influenced the associations. Based on our measures of MD and weight status, we are most likely to have underestimated the associations under study.

Data on disability pension and unemployment were extracted from quality registers with high coverage of the total population. These information sources are less prone to misclassification. However, measuring social capital and job strain from health surveys is not a straightforward process. In this thesis, social capital was operationalized on a structural and a cognitive level, including the vertical and horizontal dimensions commonly used in previous studies (170-172). Other relevant information reflecting social capital, but unavailable to us, is on social and financial support, and civic participation, for example, in voluntary activities. We used a shortened version of a Swedish instrument to measure job strain (173), which has been shown to correlate well with the full version (174). Further, we used several approaches to investigating job strain between people with MD and obesity and those without these conditions (175). To summarize, we included several variables and approaches to measure and compare social capital and job strain between our study groups. Lastly, the probability of misclassifying social capital and job strain inaccurately is most likely of a similar magnitude between the study groups; hence, the estimates should be underestimates rather than overestimates.

#### **5.4.3 Confounding – other possible factors explaining our study findings**

In observational studies, unmeasured and residual confounding is of great concern. We attempted to account for socio-demographic factors, including age, sex, and country of birth, educational level, socio-economic status, and income level, when investigating the exposure-outcome associations in our studies. However, if information on health-related behaviors, work-related factors, and stigmatization/discrimination had been available, the large difference in risk of job strain, disability pension, and unemployment between people with MD and obesity and people without such conditions might have been further attenuated.

#### **5.4.4 Generalizability – extending our findings to other populations**

The patterns of results presented in our four studies are context-dependent, but most likely reflect the life circumstances of people with MD and/or obesity in the other Nordic countries, which have a comparable prevalence of obesity and MD, and also similar welfare regimes. However, formally, our results can only be generalized to the geographical areas and time periods that were investigated after taking random and systematic sources of bias into account. We should, however, be very cautious in generalizing our findings to other countries that differ in their social welfare systems, work-integrating measures, and work policies (176).

## 6 CONCLUDING REMARKS

Although Sweden is one of the most equal countries in the world, the results presented in this thesis show that inequalities in social and working life participation still remain among people with mobility disability and obesity, a fairly unrecognized group of people in previous research. Further, MD seemed to have stronger impact on social and working life participation than overweight/obesity according to the used information sources.

Possibilities for future research on social inequalities in this field of research are numerous. An area of particular importance is contextual factors that may facilitate or hinder social participation of people with MD and/or overweight/obesity. Although these factors for obvious reasons are difficult to compare between countries they are of key importance for social participation including activity in working life among people with MD and/or overweight/obesity.

The more comprehensive our understanding becomes of how MD and overweight/obesity jointly or separately hinder/facilitate people's societal participation, the easier it should be to advocate for their interests and rights in society, and for decision and policy makers to take action by allocating resources and interventions in a cost-effective manner.

For public health researchers and practitioners, more longitudinal studies are warranted to investigate social participation of people with MD and/or obesity. Such research should ideally follow these groups of people from young adulthood to late working age, and apply repeated measures of MD, weight status and relevant outcomes. Such life course research should be designed to shed further light on confounding and mediation issues as well as stigmatization.

Interventions aiming to prevent obesity in younger or adult populations with or without disability may be of importance, but will often be complicated and expensive, and may produce smaller effects than desired (177, 178). Interventions addressing environmental factors could be of importance, for example, those aiming to facilitate better social support at work in accordance with the specific needs of people experiencing MD and overweight/obesity, which could remove barriers in their work environment related to psychosocial factors.

Research on determinants of social participation and of social inequalities of people with MD and overweight/obesity might push development of policies and legislation improving quality of life of these groups of people (128, 179, 180), by stimulating active labor market policies (181), and reducing stigmatization (133, 140, 182).

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## 9 SAMMANFATTNING

### 9.1 BAKGRUND

Världsomfattande studier visar att människor lever i genomsnitt längre men inte nödvändigtvis i god hälsa utan med sjukdom och funktionsnedsättningar. Denna avhandling fokuserar på individer med ett rörelsehinder och/eller övervikt (främst fetma) och undersöker hur dessa funktionsnedsättningar påverkar förmågan att vara delaktig i privat- och arbetsliv vilket är ett relativt outforskad område.

Det finns ett flertal konceptuella modeller som beskriver uppkomsten av en funktionsnedsättning t.ex. den internationella klassifikationen av funktionstillstånd, funktionshinder och hälsa – på engelska the International Classification of Functioning, Disability and Health (ICF). Enligt ICF uppstår en funktionsnedsättning då en individs vardagliga aktiviteter och delaktighet tillsammans med andra förhindras. Funktionsnedsättningen kan uppstå genom ett samspel mellan en individs hälsa, kroppens funktion/struktur, personliga faktorer samt den omgivning individen lever i. Personliga faktorer avser exempelvis ålder, kön, socioekonomi samt attityder och värderingar. Omgivningsfaktorer i ICF avspeglar den omkringliggande miljöns beskaffenhet men även samhällets organisation, normer och värderingar.

Ett rörelsehinder kan t.ex. uppstå när en människa, på grund av sjukdom eller bristande kroppsfunktioner, befinner sig i en miljö med fysiska och/eller sociala hinder vilket kan förhindra dennes deltagande i privat- och arbetslivet. Inom folkhälsovetenskap är det vanligt att personer med rörelsehinder identifieras i stora hälsoenkäter genom att de svarat att de inte klarar av att utföra vardagliga aktiviteter som att gå en kortare sträcka eller stiga på/kliva av en buss. För att klassificera individer som överviktiga eller feta används ofta WHO:s internationella klassificering. Den baseras på kroppsmasseindex (BMI) beräknat som vikt (kg) dividerat med längd i kvadrat ( $m^2$ ). Ett BMI-värde som är större eller lika med 25 ( $kg/m^2$ ) klassificeras som övervikt och ett BMI större eller lika med 30 klassificeras som fetma.

Idag är rörelsehinder och fetma relativt vanliga funktionsnedsättningar i Sverige, där ca 10 % av den vuxna befolkningen har ett rörelsehinder och ca 11-12 % är feta. Det finns även ett samband mellan dessa funktionsnedsättningar. Individer med fetma kan ha svårare att röra sig p.g.a. problem med förslitningar i exempelvis knä, höft och rygg. Personer med rörelsehinder riskerar att bli fysiskt inaktiva vilket kan leda till viktuppgång. En svensk studie har visat att prevalensen av fetma var 21 % bland rörelsehindrade män och 32 % bland rörelsehindrade kvinnor.

Socialt kapital kan ses som en individuell tillgång som genereras genom olika typer av relationer, exempelvis till vänner och kollegor. Tillgången kan vara ett jobbtips eller socialt- och finansiellt stöd. Socialt kapital kan samtidigt ses som en grupp-tillgång där individer i ett socialt nätverk delar gemensamma normer och värderingar vilket skapar tillit och respekt som slutligen kan skapa möjligheter för individerna inom nätverket. Individerna i nätverket kan även kollektivt göra olika åtaganden som främjar samhället i stort såsom att bilda volontärorganisationer. Ett flertal "*instrument*" har utvecklats för att socialt kapital på både individ- och grupp-nivå. Vidare så har socialt kapital delats in i olika dimensioner och nivåer. Generellt fokuserar den strukturella nivån på vad individen gör i sina relationer eller sociala

nätverk. Den kognitiva nivån fokuserar på vad individen känner, tycker och tänker om andra individer i sina relationer eller nätverk.

Att ha en värdig roll i samhället, inte minst i arbetslivet, är en mänsklig rättighet och fundamentalt för människors självkänsla och livskvalitet. Som nämnts ovan kan rörelsehinder och/eller övervikt ha en negativ påverkan på människors arbetsliv genom en ökad risk för sjukersättning (*eng. disability pension*) och långvarig arbetslöshet. Forskningen visar entydigt att personer med funktionsnedsättningar eller övervikt i större utsträckning exkluderas från arbetsmarknaden och arbetskraften jämfört med personer utan dessa funktionsnedsättningar. Bidragande orsaker är bl.a. sämre hälsa, en generellt låg utbildningsnivå, bristande anpassning av arbetsprocesser och arbetsmiljön eller via stigmatisering och/eller diskriminering.

När det gäller människors arbetsmiljö finns ett antal väletablerade modeller som beskriver hur riskfaktorer i arbetsmiljön är kopplat till sämre hälsa och sämre prestation i arbetet. I denna avhandling används Karaseks-Theorells psykosociala krav-kontroll-stöd modell för att studera den självupplevda arbetsmiljön hos människor med rörelsehinder och/eller övervikt. Enligt denna modell kan en för hög arbetsbörda via fysiska och/eller psykologiska krav tillsammans med en låg kontroll över arbetssituationen, dvs. möjligheten att fatta egna beslut och arbeta självständigt, skapa stress som är skadlig för hälsan och arbetsprestationen (*eng. job strain*). Socialt stöd i arbetet från kollegor och överordnade är också inkluderat i modellen och verkar som en buffert som kan mildra den skadliga stress som kan uppstå.

## 9.2. SYFTE

Det övergripande syftet med denna avhandling var att undersöka skillnader i socialt kapital och arbetsdeltagande hos personer med både rörelsehinder och övervikt jämfört med personer med endera eller ingen funktionsnedsättning. Det specifika syftet med de enskilda studierna var:

1. Att undersöka om det fanns skillnader i socialt kapital mellan normalviktiga, överviktiga och feta personer med eller utan ett rörelsehinder under en åtta-års period (**Study I**)
2. Att undersöka om personer med rörelsehinder och/eller fetma hade högre arbetsstress än personer utan funktionsnedsättningar (**Study II**)
3. Att utforska om personer med både rörelsehinder och fetma hade ökad risk för förtidspension jämfört med personer med endera eller inget funktionshinder (**Study III**)
4. Att undersöka om personer med både rörelsehinder och fetma hade ökad risk för arbetslöshet jämfört med personer med endera eller inget funktionshinder (**Study IV**)

## 9.3 METOD

Stockholms folkhälsoenkäter (studie I, II och IV) och undersökningar av levnadsförhållanden (studie III och IV) var de två stora datamaterialen som användes i denna avhandling. Stockholms folkhälsoenkäter baseras på ett slumpmässigt urval av män och kvinnor i åldern 16 och uppåt från Stockholmsregionen. Undersökningarna av levnadsförhållanden baseras på ett slumpmässigt urval av män och kvinnor i åldern 16 och uppåt från hela Sverige. Relevant data

erhölls även från stora kvalitetsregister som administreras av statistiska centralbyrån (SCB) och Försäkringskassan, där majoriteten av Sveriges population ingår (över flera generationer).

Studiepopulationerna i denna avhandling utgjordes av män och kvinnor mellan 19 och 64 år. Med hjälp av självrapporterade uppgifter om längd, vikt och rörelsehinder från enkätdata skapades totalt sex studiegrupper: individer med normalvikt, övervikt och fetma med eller utan ett rörelsehinder (totalt sex grupper). Normalviktiga personer utan rörelsehinder var referensgrupp (mot vilken övriga grupper jämfördes).

Socialt kapital skattades med hjälp av fyra teoriförankrade frågor. Två om strukturellt socialt kapital dvs. deltagande i sociala aktiviteter och röstdeltagande i val. Två frågor berörde kognitivt socialt kapital dvs. tillit till människor i bostadsområdet eller till myndigheter, institutioner och politiker.

Psykosocial arbetsstress eller "job strain" definierades och analyserades med utgångspunkt i flera olika teoretiska och analytiska ansatser i krav-kontroll-stöd-litteraturen. Empirisk information från sju frågor användes från folkhälsoenkäterna för att skatta "job strain". Två frågor behandlade arbetskrav, tre frågor arbetskontroll/beslutsutrymme samt utvecklingsförmåga. Därtill användes två frågor om socialt stöd i arbetet.

Sjukersättning är bidrag som ges till individer över 30 år med minst 25 % nedsatt arbetsförmåga. I vår studie har fler än 90 % av personerna med sjukersättning 100 % nedsatt arbetsförmåga och antas inte återvända till arbetsmarknaden. Individer med sjukersättning följdes upp i register från Försäkringskassan. Två objektiva utfall studerades och jämfördes mellan studiegrupper: i) långvarig sjukersättning (oberoende av diagnos) och ii) långvarig sjukersättning som beviljats för specifika diagnoser (muskuloskeletala och psykiatriska problem).

Individer i arbetslöshet följdes upp i Longitudinella integrationsdatabasen för sjukförsäkrings- och arbetsmarknadsstudier (LISA) från SCB. Tre objektiva utfall studerades och jämfördes mellan studiegrupper: i) tid till första arbetslöshetstillfälle, ii) tid till första långtidsarbetslöshetstillfälle, samt iii) antal dagar i arbetslöshet (i genomsnitt) per år under uppföljningstiden.

## 9.4 RESULTAT

I studie I hittade vi inga statistiskt signifikanta skillnader i strukturellt socialt kapital mellan referensgruppen och de fem exponeringsgrupperna. Dock fann vi att personer med rörelsehinder hade, oavsett BMI-kategori, sämre longitudinell utveckling av kognitivt socialt kapital jämfört med referensgruppen. Resultaten indikerar att ett rörelsehinder bidrar till en sämre utveckling av kognitivt socialt kapital, oavsett BMI-klass.

I studie II, fann vi att personer med både rörelsehinder och fetma i högre grad upplevde en skadlig arbetsstress "job strain" i jämförelse med referensgruppen. Socialt stöd i arbetet minskade arbetsstressen för samtliga grupper. Resultaten indikerar att förekomst av rörelsehinder har större betydelse för grad av upplevd arbetsstress i arbetslivet än fetma.

I studie III, hittade vi inga klara evidens för att risken var högre för individer med både rörelsehinder och fetma än för dem med endast en funktionsnedsättning. Personer med rörelsehinder, oavsett BMI-grupp, hade en kraftigt ökad relativ risk att få långvarig sjukersättning (oberoende av diagnos) i jämförelse med referensgruppen.

I studie IV, hade personer med både fetma och rörelsehinder högst relativ risk för arbetslöshet (oavsett studerat utfall) och fler dagar i arbetslöshet jämfört med referensgruppen. Dock fann vi inga statistiskt säkerställda skillnader mellan gruppen med fetma och rörelsehinder och övriga grupper med rörelsehinder (normalviktiga eller överviktiga). Resultaten indikerar att ett rörelsehinder har störst inverkan på risken för arbetslöshet oavsett BMI. Resultaten från kohorterna var inbördes överensstämmande, vilket indikerar att definition av rörelsehinder troligen inte är avgörande för vilken bild man får av deras risk för arbetslöshet.

## **9.5 SLUTSATS**

Trots att Sverige räknas som ett av de mest jämlika länder i världen så kvarstår tydliga ojämlikheter i hälsa och delaktighet hos personer med funktionsnedsättningar. Resultaten som presenteras i denna avhandling visar entydigt att personer med rörelsehinder och fetma är i mindre utsträckning delaktiga i samhälls- och arbetslivet jämfört med personer utan dessa funktionsnedsättningar. Resultaten indikerar även att det är rörelsehinder som har en särskilt stor påverkan på människors delaktighet i samhället och inte BMI. Mer forskning krävs för att bättre förstå hur rörelsehinder och övervikt påverkar olika aspekter av människors liv.